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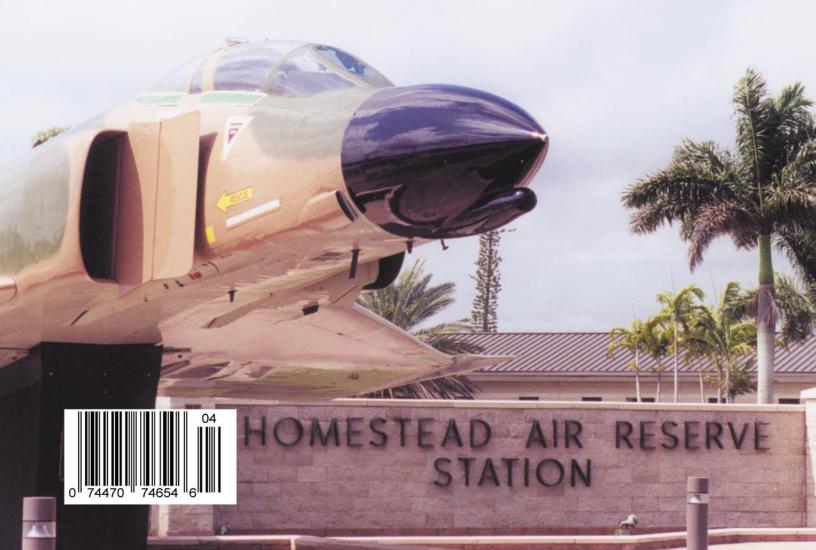


April 2001

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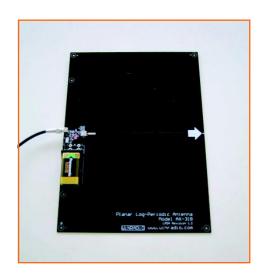
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Vol. 20, No. 4

April 200



On our Cover

My Most Enjoyable Channels: MilCom!

By Robert Wyman

From early childhood memories of the Cuban Missile Crisis, the annual open house at Homestead Air Force Base, to the advent of the Bearcat 210 scanner which opened up new monitoring possibilities, military communications have always fascinated the author. They still do.

The main obstacles to this hobby are the same now as before: the availability of proper receiving equipment and discovering active frequencies. There is no publicly available government resource for military or government assignments as there is for civilian allocations. But the challenge is half the fun!

There's plenty to hear if you live in the vicinity of an Air Force Base or other military facility. Units such as law enforcement, fire-rescue, base hospitals/ambulances, civil engineering, various maintenance activities, schools, conference centers and recreational areas each utilize VHF and UHF land-mobile radio communications. Monitoring aircraft around Homestead AFB is still one of the author's favorite activities: you'll find a selection of active frequencies in the story starting on page 10.

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By Richard Q Marris G2BZQ

MT readers have enjoyed previous loops designed by the author. This time he's designed a loopstick – a 36-in. long ferrite loop antenna designed to give maximum nulling in the medium wave spectrum. This takes in the AM broadcast band, U.S. MEDFER experimental band, amateur radio bands, various navigational beacons, and more – something for everyone.

This highly directional loop can be of benefit in eliminating the interference from which all MF signals suffer.

A Linear Loaded Quad for 15 MHz......17

By Douglas A. Blakeslee

Of the various antenna choices available to the monitor looking for improved performance, the quad (also known as the quad loop) has some distinct advantages. The primary three are low noise pickup because the loop is a closed system, higher gain than a dipole cut for the same frequency, plus a lower angle radiation pattern for good long distance (DX) performance. Here's one design for performance on the 15 MHz and higher bands, that is not only inexpensive, lightweight, and constructed of easily available components, but it's rotatable!

You Can Take it with you!20

By Arthur R. Lee

Not too many folks try going mobile with an HF rig – partly because a vertical HF antenna for the range is too long. Add to that the problem of modern-day plastic bumpers and sleek new car design, and the options narrow even further. However, here's one solution, using a standard trailer hitch, fold-over Hustler antenna, and the roof rack.

Scanning Florida's Space Coast.....21

By John Mayson

In the March issue, *MT* readers took a trip down I-4 and across central Florida. But we barely bypassed some of the most popular beaches and sights just to the south of our starting point at Daytona Beach. Here we pick up public safety scanning in Brevard and Osceola counties.

Cover photo by Bob Wyman. Below photo courtesy DoD.





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Reviews:

Bob Grove reviews the HF portion of the Yaesu VR5000 and decides it offers a great deal for the money (p.82).

Bob Parnass finds the VHF and UHF portion of the *AR8600* is on a par with other scanners, and, while it doesn't perform well on HF, it simply oozes with features and options (p.84).

If you're looking for a handitalkie for communications over better-than-FRS ranges and the

ability to receive weather information as well, Jock Elliott says he can wholeheartedly recommend the *Co*bra Professional 2000WX (p.86).

The AX-31B active VHF/UHF antenna from WiNRADiO is a surprisingly flexible antenna which works well on any scanner.

Always on the prowl for better radio control solutions, John Catalano pits *Game Commander 2* against Microsoft's new Game *Voice* (p.80).

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Stand by for change at the Republican-led FCC

There are major changes underway at the Federal Communications Commission. Commissioner Michael Powell, the son of Secretary of State Colin Powell, is the new FCC Chairman. He will oversee the administration's direction on telecommunications, broadcast and cable matters. Powell takes over at a crucial time when regulators are trying ensure competition as the Internet, telecommunications and cable industries all converge.

Like his father, Mike Powell wanted to make the military his life's career. But it was cut short by a devastating automobile accident in 1987. After a long rehabilitation, Mike Powell graduated from Georgetown University Law School and became a telecommunications lawyer. He joined the Clinton administration in the U.S. Justice Department's antitrust division. The 37-year-old Michael Powell, a Republican, was appointed to the FCC in November 1997.

He replaces outgoing Chairman Bill Kennard, a Democrat who resigned from the FCC on Jan. 19 – the day before Republican President George W. Bush took office. Powell does not need to be confirmed by the Senate. The president can designate the chairman from a sitting commissioner without any Senate action. Kennard has already accepted a position as a senior fellow at the Aspen Institute's Washington-based Communications and Society Program.

A Powell-led commission is expected to bring a more business-oriented approach to the agency, compared to Kennard's regulatory-oriented approach. He has already voiced apprehension about the wide array of regulations facing broadcasters, telephone companies, cable operators and Internet Service Providers.

The Clinton administration unleashed the *Telecommunications Act of 1996* which sought to bring competition to the industry. So far it hasn't worked and has only resulted in large companies getting larger as they merged among themselves.

The new FCC is expected to be a "hands off" Commission. Instead of shaping markets, the Powell-led FCC is expected to let the marketplace determine its own direction. Powell also is in favor of restructuring the Commission along functional rather than industry lines.

Before leaving, Kennard expressed his concern about a more business-friendly FCC under the new Administration. He feels that a more business oriented approach will translate into policies that will benefit incumbents rather than innovation among new entrants.

Kennard's concerns are well founded. Powell's record at the FCC shows he is more restrained about regulating industries that, like technology, constantly change. He would rather let the

marketplace decide.

He is on record as opposing regulation of the Internet since restraining computer-related information services would undermine innovation. One of Powell's first initiatives is to push for the expansion of high speed broadband Internet access to homes and small businesses.

Powell enjoys cordial relations with House and Senate leaders. The Powell appointment drew high praise from key lawmakers especially from Rep. Billy Tauzin (R-La.), chairman of the U.S. House Commerce Committee which oversees over the agency. Tauzin often criticized Kennard's policies and direction and believes Powell "...understands the benefits to consumers of aggressive competition in the marketplace and ...will work with Congress to complete the task of deregulating the telecommunications industry."

About a week after Powell became FCC Chairman, Commissioner Harold Furchtgott-Roth, a Republican, announced he would not be seeking reappointment to a second term. His first term expired June 30, 2000. Saying he wants to return to the private sector, Furchtgott-Roth will continue to serve on the Commission until a departure date is worked out with the Administration. He said Powell "...will make a great chairman."

The FCC consists of five Commissioners which is typically split three to two in favor of the ruling political party. The Furchtgott-Roth announcement now leaves President George W. Bush with two slots to fill on the FCC. Both are expected to be Republicans since two Democrats already serve on the panel, Gloria Tristani and Susan Ness. With a new Republican Chairman and two more rookie Republican Commissioners on the way, the Bush administration indeed has the potential to totally change the direction of U.S. telecommunications policy.

The Justice Dept has released an independent report on Carnivore, the e-mail sniffing software, which is similar to a wiretap. The FBI says it uses the program to monitor suspected criminals by installing the system at Internet providers to monitor their e-mail activity. The study was ordered by Congress after civil-liberty groups raised concerns about unreasonable search and seizure.

The use of the surveillance software came to light when ISP EarthLink resisted having the program installed on its network. The FBI and DOJ maintain the surveillance system is only deployed to monitor specific criminal activity under a court order. But privacy advocates question the allegation and point out that the software can be configured to capture all Internet traffic and track users.

The report completed by a group of researchers at the Illinois Institute of Technology concluded that the controversial FBI electronic wiretap tool was appropriate for law-enforcement use but recommended the DOJ maintain tighter control of the e-mail monitoring system. They also said all Carnivore searches should require specific Justice Department approval and that the software should be modified to document all of its activities to prevent abuse.

The FCC has socked Madison, Wisconsin, radio station WZEE with a \$7,000 fine for playing an indecent, unedited recording by Grammy-nominated rapper Eminem. (Real name: Marshall Mathers.) WZEE is owned by radio giant Clear Channel Communications which has about 1,000 stations. A listener sent in a tape recording of the broadcast to the FCC. The FCC's decency standards are enforced from 6 a.m. to 10 p.m.

Last-Minute Report:

House Cleaning at the FCC

On Friday, (February 16th) FCC Commissioner Gloria Tristani made it unanimous. She too will leave the agency to seek some sort of elected office in her native state of New Mexico. That means all four incumbents under newly appointed FCC Chairman Mike Powell are leaving the Commission. He gets a brand new crew ...and probably input as to who they will be. In unprecedented fashion, President Bush will have to appoint four new Commissioners almost immediately! You can bet that the FCC will be seeking new "business-friendly" directions.

This certainly looks like a year of major changes at the FCC. Don't look for too much to happen this year as staffers for the Commissioners and various bureau and division chiefs start the shuffle to find new jobs. A year from now you won't recognize the agency. The previous FCC fought Congress. The new one will follow their directions.

The Dow Jones Newswire said FCC Commissioner Gloria Tristani will leave the agency by year's end to pursue either a congressional spot or the governor's mansion. New names surfacing as potential Commissioner candidates include Michael Copps, chief of staff to Sen. Fritz Hollings (D-SC); Andy Levin, aide to Rep. John Dingell (D-Mich.); Kathleen Abernathy, a telecom attorney; and Intel Corp. lobbyist Peter Pitsch, a former FCC chief of staff.

We'll report in future columns on what's behind these developments and what we may be in for. Stand by for change!



Interesting and Unusual Websites

Brian Rogers (the one from England) reprints a 1985 MT article on the Russian "Woodpecker" article on his web site at http://dspace.dial.pipex.com/brogers/wpecker.htm. He says it "forms one of four articles (and a poster) relating to the Russian Woodpecker signal. I have had a lot of interest shown in the articles, which I hope form a useful resource for those interested in this 'mother of all signals."

- Brian Rogers, West Sussex, South-East England

http://www.nsa.gov/wwii/papers/start of digital revolution.htm

"Someone sent this to me and I thought you might want to share it with the *MT* readers. Pretty amazing stuff for the time. Yes, it's on the NSA site-which if you haven't poked around on, there's some cool stuff to be found:-)

- Michael Graham

http://www.nara.gov/iwg/report/ossrecs.html

"I was looking up some information at the National Archives & Records Agency (NARA) website and came across the historical radio related piece of information. Having an interest in military history and the Holocaust I took the time to investigate. Amazing what can be pieced together and learned from just listening to a conversation."

- René. B. Valladares, KB3CGA

Emerson Video Converter

"I read with great interest the article on page 87 of the February issue about Multi-System Video Converter because I have the same problems not being able to watch videos from my friends in Germany. Now at least I have sources for a converter.

"By the way, PAL was invented by Walter Bruch of Telefunken in Germany, and not by the British."

- Cord Schuette, Computer International, computer-int@mintcity.com

Prop Charts Gone for Good?

Edward Stroh and Richard Hansen asked if Jacques d'Avignon's propagation page was a temporary or permanent cut, and asked for other sources of propagation information.

The charts were a casualty of the page reduction that made it possible to continue mailing the magazine in a plastic wrapper, but there are a number of web sites where you can keep up with propagation conditions. Of course you can listen to WWV for the current sun spot count, and there are several free or inexpensive computer programs to help interpret these numbers. You can also find all kinds of resources for HF propagation off the Amateur Radio Relay League's website at http://www.arrl.org and

the Radio Amateurs of Canada web site at http://www.rac.ca However, nearly all print publications have discontinued their propagation charts, so I can be of little help there.

Education by Remote

Bob Gehle, who provided the news clipping referenced in this month's "Communications" item *Telecoms vs Educational Institutions vs Pentagon*, has these comments to add:

"My wife gave me a short wave receiver for Christmas and I have been enjoying DXing and *Monitoring Times* ever since. I appreciate that your publication has valuable information for beginners and advanced individuals. I will enjoy reading your magazine for many years to come.

"The 'Washington Whispers' column of the January 2001 issue had a piece headed 'The good news is that the Internet is going wireless.' The 3G issue discussed in the column may have a significant impact on the Instructional Television Fixed Service licenses (2.5 GHz – 2.686 GHz) held by many educational institutions (K-12 through university).

"The FCC in its Two-Way Rule and Order (Parts 1, 21, and 74 of Title 47 Code of Federal Regulations) opened the door for educational institutions to work with wireless service providers (Sprint, Digital Broadcast Corp., Bell South, and others). These companies want to lease the spectrum to provide internet access to citizens. Schools, colleges, and universities would receive access to the technology resources provided by these companies.

"Those of us who provide instruction through the ITFS spectrum are concerned about the potential loss to our students as a result of a poor decision on 3G."

Bob Gehle, Program Administrator, Manatee
 County School Board

Canadian Correspondence

"I wanted to pass on a few comments regarding your magazine. I have been reading *MT* for quite a few years. I look forward to it every month as it's always packed with great information. I find *MT* fits what I want to read and use as a reference.

"My listening is quite reduced these days (with 2 young kids, etc.) but I am trying to find more time for it... I really like the plastic cover on the magazine. It would sometimes arrive up pretty beat up, but problem solved: every issue that has arrived since you started using the plastic is perfect!

"Attached is a photo of my shack. I don't think I've purchased any new equipment in about 8 years but this works great for me. Included are * Kenwood TS-440S HF. Great ham rig and general coverage receiver. I'd love to get my hands on the R-5000.

* Yaesu FT-2400H 2 meter. Excellent and tough.



- * Realistic PRO-2005. Modified of course. (Thanks Bill Cheek, I'll miss you)
- * Realistic PRO-2020. Old, but I could never part with it. It was my first real scanner.
- * Alinco DJ-580. Also modified (of course)
- * Innova Power Pack for the HT. Great unit, I can run the Alinco for almost 5 days continuous.
- * Realistic TRC-480 CB. A reminder of my teenage years
- * Yaesu FRG-7. I bought that new and what a joy it was for me at the time.

"I run the Kenwood through two Realistic Minimus 7 hi-fi speakers which provide great sound. The scanners and 2M rig all have their own Realistic communication speakers (Cat# 21-549). Again, much improved sound. The old radio is a Sylvania model no.1101 AM receiver. It has the original tubes and even the serial number sticker on the back.

"Antennas include your scanner beam, a Radio Shack discone and a few specialized antennas. For HF I just use dipoles and long wires off a small tower."

- Cliff Fournier, VE7CGF, Canadian west coast

"Really enjoyed Larry Van Horn's article on finding Canadian frequencies (January 2001 'Service Search'). Living near Canada, above line A, how do I find their Public Safety channels? It would surely be handy to be able to determine co-channel and adjacent channel user."

- Ron Gilson

Larry says that unfortunately Canada lists very little public safety information on the internet and we are aware of no definitive Canada-wide radio hobby frequency guide. *Monitoring Times* would be happy to publish more Canadian frequencies or promote frequency guides if our Canadian scanner listeners will share the information. With enough input, a Canadian column could become viable... Anyone want to take on the challenge?!

Your letters, opinions, comments, and corrections are welcome at *mteditor@grove-ent.com* or to Rachel Baughn, P.O. Box 98, Brasstown, NC 28902.

COMMUNICATIONS

Radio Honor Roll

Long-distance Search and Rescue

A ship floundering in heavy seas off Indonesia was rescued after a British tourist, Rebecca Fyfe, sent an SOS mobile phone text message to her boyfriend. Nick Hodgson was halfway around the world in an English pub when he received the text message: "Call Falmouth Coastguard, we need help, SOS."

The boat's engines were flooded in the Lombok Strait, leaving 12 passengers and six crew adrift without a radio or flares. Falmouth Coastguard contacted the girl on her mobile phone, but she was unable to give her precise location. The coastguard asked the Australian Coastguard to relay the message to the Indonesian Search and Rescue Authority. They were leated when the boat finally washed up in North Lombok. All on board were fine.

Indian Hams

Hams assisted with relief operations in the Indian State of Gujarat following the January 26 earthquake which took over 60,000 lives and left more than 600,000 homeless. Bangalore-based Guru Rao, VU2GUR, and Sandeep Shah, VU3SXE, a Gujarati Bangalorean engaged in relief work in Gujarat, took advantage of the UO-14 amateur FM satellite to provide communications to the stricken region.

Another Bangalore amateur, Chandru Ramachandra, VU2RCR – a former UNESCO official – drove his SUV to Bhuj, 1700 km distant. Carrying a medical team and supplies, he set up a station to establish a link between Bhuj and Bangalore. 18 amateurs from the State of Karnataka handled communication regarding placement of doctors and medical supplies as well as health-andwelfare inquiries into areas where the telephone system was out.

"This has become a practical exam showing our capability and preparedness in disaster management," said Bangalore Amateur Radio Club President Lion Ajoy, VU2JHM.

Most of the earthquake-related traffic was handled via HF on 40 and 20-meter SSB, although some VHF FM links were established for local work.

Spectrum Turf Wars Intensify

Public Safety vs Television

Since 1997 a plan has been in the works to create 32 radio channels for interagency communication between public safety officials from local, state, and federal agencies nationwide so that, for example, federal disaster relief workers could coordinate by radio with local police authorities when on the scene of a major preplanned event or unexpected emergency.

The Federal Communications Commission already has designated the frequencies – located in the 700 MHz band – for the communications network, and near the end of January the Commission adopted Project 25 Phase I as the voice standard for communications on these channels. The Commission also adopted the Project 25 data standard which will allow public safety entities to send status messages or short E-mails to one another.

The Commission also filed a Notice of Pro-

posed Rulemaking regarding the migration to an efficiency standard of one voice path per 6.25 kHz on the General Use channels. The Commission believes that eventual adoption of such an efficiency standard would be in the public interest, suggesting that the earliest date the Commission would require 6.25 kHz technology in new equipment would be December 31, 2005.

The fly in the ointment is the fact that before the 32 channels can be used nationwide they must be relinquished by broadcasters operating analog TV stations between channels 60 to 69. Broadcasters are supposed to return their analog channels by 2006 or when digital television reaches 85 percent of the market – whichever is later. Until this happens, the radio safety channels will only be available in parts of the country where broadcasters are not already occupying the frequencies.

Television vs Telecoms

The FCC was set to begin auctioning the frequencies not set aside for public safety (747-762 and 777-792 MHz) March 6, 2001. However, Verizon Wireless – the largest bidder in a recently-completely PCS auction – requested the auction be postponed. The uncertainty whether broadcasters will vacate the channels by the 2006 deadline was used as an argument both for and against the postponement – one questioning whether the spectrum will bring in as much revenue as it should if bidders are uncertain the channels will become available on schedule, and the other side deploring the hold-up in roll-out of new technologies. The FCC chose to reschedule the auction for September 12, 2001.

The 700 megahertz airwaves are highly coveted by wireless and other phone companies as a new avenue for delivering advanced telecommunications services.

Telecoms vs Educational Institutions vs Pentagon

In the flurry of activity in the last few months of the Clinton administration, pressure was put on federal agencies to cooperate in identifying available spectrum for the expansion of telecommunications technologies, particularly third-generation (3G) technology which combines multiple functions into one wireless unit. Private industry is most interested in the frequencies in the 1755 to 1850 megahertz band now controlled by the military, which are adjacent to those used by existing domestic wireless phone services and include frequencies that the World Radio Conference earmarked for next-generation wireless phones.

However, the military counters by saying this spectrum includes airwaves reserved for Air Force communications, intelligence-gathering and the global positioning satellite navigational system. It could cost millions of dollars and take as much as 30 years to locate and move these services to a different part of the spectrum.

If the Pentagon is not won over, the next place the industry is likely to look is at the 2500-2686 MHz band, licensed to Multichannel Multipoint Distribution Service ("MDS") and Instructional Television Fixed Service ("ITFS"). In her article in *Information Technology*, Goldie Blumenstyk said, "Colleges and other education broadcasters are at the vortex of some powerful political forces: cellular-telephone manufacturers and service pro-

viders, like Motorola and Verizon, eager for frequencies that will help them develop globally compatible 3G services; wireless-communications companies, anxious to deploy their new Internet services after investing more than \$2-billion to buy out companies that had previously leased bandwidth in the spectrum from educational broadcasters; and the federal government, which would welcome the chance to pocket the billions of dollars that could potentially be raised though a 3G-spectrum auction."

Media reports on the new FCC chairman, Michael Powell, indicate he is inclined to allow the marketplace to determine direction, rather than government regulation steering technology. Who will win in a scuffle between broadcasting, public safety agencies, the telecommunications industry, the Pentagon, and educational institutions? Stockmarket investors, place your bets now. If the FCC doesn't represent the public interest, at least we get to vote with our pocketbook when the latest gadgets come on the market. To go to bat for education, visit the Wireless Education Broadband NOW web site at http://www.itfs.org/webnow/

FCC Begins WRC-2003 Preparations

In preparation for the next World Radiocommunication Conference in 2003, the FCC's WRC-03 Advisory Committee met January 30 for the first time. The Advisory Committee provides an opportunity for interests outside the federal government to develop and debate US draft proposals for possible adoption.

WRC-03 will deal with wide-ranging telecommunications issues, including IMT-2000 or socalled ''third-generation" or ''3G" cellular telephone devices, fixed services, mobile and fixedsatellite issues, HF broadcasting, satellite broadcasting, and regulatory matters.

Amateur Radio-related issues on the WRC-03 agenda include the basic rules for the Amateur



April 8: Stoughton, WS

Madison Swapfest sponsored by Madison Area Repeater Assoc at the Mandt Community Center, Stoughton Junior Fair Grounds, Mandt Park; talk-in 147.150. Adm \$5, 8a.m. For more info call 608-245-8890 or visit http://www.qsl.net/mara/

April 28: Windsor, SC

Salkehatchie ARS Tailgate party at Community Center, 0900-1600; Talk-in 147.030(-), CB Chan 22. Adm free; \$5 tailgate. BBQ chicken, raffle to win flight in vintage WWII SNJ trainer. For more info call Bill Wetzel W40XA, 803-245-5522, W40XA@oburg.net

May 5: Cedarburg, WS

Ozaukee Radio Club 23rd annual Cedarburg Swapfest at the Circle-B Recreation Center (Hwy 60 and Co I); talk-in 146.37/. 97 and 146.52; 8a.m.-1p.m.; adm \$4. Food, license exams. SASE to Gene Szudrowitz KB9VJP, W55 N865 Cedar Ridge Drive, Cedarburg, WI 53012; 262-377-6792.

COMMUNICATIONS

and Amateur-Satellite services, including the requirement for Morse code proficiency for access to HF bands

WRC-03 will consider realignment of amateur and broadcasting bands around 7 MHz in search of a "harmonized" worldwide 300-kHz allocation. An examination of HF broadcasting allocations from approximately 4 to 10 MHz also is on the agenda. Conference participants also will consider abandoning an earlier commitment for HF broadcasters to shift from double to single-sideband AM modulation in favor of digital modulation.

WRC-03 will consider allocations for nongeostationary, non-voice mobile satellites (the socalled "Little LEOS") below 1 GHz, as well as spectrum above 1 GHz for feeder links. In addition, the conference will consider Earth Exploration-Satellite Service in the 420 to 470-MHz band.

A WRC-03 Web site has been set up at *http://www.fcc.gov/wrc-03* along with a mailbox for the committee, *wrc03@fcc.gov*. WRC-03 is scheduled to begin June 9, 2003.

BoatU.S. Provides Free DSC Radio Registration

Since 1999, the FCC has required marine radio manufacturers to include a Digital Selective Calling (DSC) capability in new radios sold in the U.S. DSC radios are fundamentally different from conventional marine radios in that (1) a maritime mobile service identity (MMSI) must be programmed into the radio to serve as a kind of "phone number," (2) DSC automatically maintains a watch on marine VHF channel 70, rather than the operator listening to channel 16, (3) the operator can call other DSC radios or coast stations directly using their MMSI, and (4) can communicate with commercial vessels that *are* required to carry DSC radios.

In December 2001, the FCC and the U.S. Coast Guard named BoatU.S. as the first non-governmental organization to issue boaters the identification numbers for marine radios with Digital Selective Calling (DSC). Before BoatU.S. volunteered, boaters wanting identification numbers had to pay \$120 for an FCC license, and neither the FCC nor the Coast Guard had the budget or staff to begin registering DSC radios that in the future could number in the hundreds of thousands.

BoatU.S. chose to underwrite the service because – although recreational boaters are not required to carry a marine radio – DSC radios have the potential to save many lives, and they wished to protect boaters from what could have been a steep fee, had the government simply turned the function over to a commercial provider.

DSC is part of the global transition in maritime distress communications from voice calls (on channel 16) to digital communication. DSC's major advantage lies in its ability to send an automatic mayday which not only identifies the vessel (by the MMSI) but also gives its location when the radio is connected to a Loran or GPS.

"It's important for boaters to understand that the Coast Guard is not yet monitoring Channel 70 for DSC maydays, and may not be until 2005-6," said Elaine Dickinson, BoatU.S. assistant vice president for government affairs. "However, there have already been instances where commercial ships required to monitor the DSC-reserved channel for distress calls have relayed DSC maydays to the Coast Guard," she said.

To register, Dickinson said, boaters may go online to *BoatUS.com* and click on "MMSI." Once the registration form is accepted, their MMSI numbers will be issued electronically. Boaters may also e-mail BoatU.S. at *MMSI@BoatUS.com*. To ask questions or get a registration form by phone, call 800-563-1536; completed forms may be faxed to BoatU.S. at 703-461-2840 or mailed to the BoatU.S. MMSI Program at 880 S. Pickett St., Alexandria, VA 22304.

Communications is compiled by Rachel Baughn, editor, from clippings submitted by our readers. Thanks to this month's reporters: Anonymous, Mobile, AL; Anonymous, Ballston Spa, NY; David Carberry, Gales Ferry, CT; Raymond Delaforce, Sterling Hts, MI; RD Hanson, Braintree, MA; Norman Hill, Arlington, VA; Ken Hydeman, Xenia, OH; Sterling Marcher, La Mirada, CA; Clive Ridpath, Soquel, CA; Doug Robertson, Oxnard, CA; Brian Rogers, Melvindale, MI; Mike Roth, Chicago, IL; Bob Schultz, St Louis Park, MN; Richard Sklar, Seattle, WA; W.O. Tribble, Macon, GA. Thanks for "e-clippings" from Chanel Cordell, Ed Mayberry, Eddie Muro, Ken Reitz, Larry Van Horn, Dan Veeneman. Special thanks to the ARRL Bulletin.



The Most Enjoyable Channels in My Radio: *MilCom!*

By Robert Wyman photos courtesy of the D.O.D.

t's the trains that I remember the most. The constant, mechanical, metal-onmetal rumble that went on all day and all night. In the early 1960s, we slept with our windows open. Our home had not yet evolved into the air conditioned fortress of later years, and the sound of military trains heading for Homestead Air Force Base kept me up all night. It would later be called the "Cuban Missile Crisis" and it's my first memory of anything "military."

As a child, I was used to the normal sounds of darkness...but this was different. Combined with news reports that I vaguely remember, it became ominous. Trains on the Florida East Coast Railroad and convoys of trucks and equipment and even missiles on U.S. Highway 1 through Miami. The military buildup had never been seen before, and it was the topic of

discussion at home and in school. "What is happening? How will it end?"

My childhood memories also include visits to Homestead's annual Open House to see the Thunderbirds and "all the jets." Homestead never disappointed us, the residents of southern Dade County. I remember the base as something special; something to be highly respected. It was a Strategic Air Command base back then, and SAC held a magical place in the eye of the public, including the children. These people were protecting Miami. They made sure we didn't have to be afraid of Castro...or even Kruschev. We were all proud to be an Air Force community. We were especially proud to be a SAC community.

I obtained my first scanner while in Junior High School. That's grades 7 through 9 for those who only know the term "Middle School." Crystals allowed it to scan up to four

channels sequentially, all in the VHF High band. I loaded it with the local police dispatch channel, the records channel and the adjacent district's dispatch channel. I used the fourth channel to swap out crystals of other agencies or districts...and it was always great sport to visit a Radio Shack in another part of Miami just to get a new crystal to play with.

My friends and I quickly collected all the crystals for all the police agencies in our area. The fire department was on UHF, so we couldn't listen to them. Homestead Air Force Base, near enough to hear the jet engine runups on the flightline each morning, was still an unattainable dream...except for monitoring an occasional mutual aid call about a rowdy Airman or something, since Homestead's Security Police desk also had a base station on the county's district police channel.

Equipment was Key

The first MilCom breakthough came in the form of the Bearcat 210. This was the world's first keyboard-programmable scanner, with 10 VHF/UHF channels plus the ability to search out new channels. Included with the scanner was a teasingly brief list of frequency allocations, including military and government bands. It was a miracle. I could finally listen to the fire department, as well as anything else at any time, all without crystals. Sleeping at night immediately became optional. Since I was now in High School, I was probably heading for the up-all-night lifestyle anyway, but this gadget made a great excuse to do so. We were even allowed to legally listen to mobile telephone calls!

By the time the Bearcat 220 came out about a year or so later, adding the VHF Aircraft Band to the monitoring mix, I had already started my "frequency list" and had mapped out almost all of the active channels in my area. Homestead Air Force Base was by then a Tactical Air Command base, and it



encompassed dozens of channels with a multitude of interesting communications.

Aircraft maintenance, security and law enforcement, fire and crash rescue, various component repair shops, command nets, fueling nets, "Follow Me" trucks, the Air Force Sea Survival School at nearby Turkey Point (using Marine Band channels), and the all-important Control Tower frequency of 126.2 continued to increase my awareness and reduce my sleep.

And you'll love this recollection: after hearing all the names and abbreviations of the various "nets," I called the base and asked who was in charge of the radios. I was eventually forwarded to an on-site Motorola technician who happily answered (almost) every question and provided the real names of (almost) every channel I inquired about! Try that today and see who shows up at your door!

Now armed with an impressive frequency list, including channel names such as "Maintenance Net A – Gold Flight" and "Transient Alert" and "Ground Controlled Approach," I entered my 20s with a greater respect for the military and Homestead Air Force Base, although I had also determined that I was not personally destined to join the ranks.

Instead, I entered local government service and integrated the radio scanning hobby through both volunteer and assigned work with the county's Civil Defense agency...later called Emergency Management...as well as through my other government assignments within the Department of Traffic and Transportation.

MilCom from Homestead remained a big part of my scanning day, with Military aviation frequencies being the most enjoyable since I could hear them (the aircraft) many miles away from the base itself. I continued to amass volumes of allocation information and frequency books, and I participated regularly in the Radio Communications Monitoring Association (RCMA) along with [longtime MT contributors and subscribers Mark Cobbeldick, Jan Fine, Bob Sherman and others. When Bob Grove moved from South Florida to North Carolina and started his company and this magazine, the entire group of South Florida monitors applauded the effort and sought to contribute as much as possible.

By the time scanners appeared on the market with the (predominantly military) UHF Aircraft Band, I was ready. Bob Grove's *Federal Frequency Directory* (now long out of print), along with the other books I researched, opened up a new avenue of monitoring on a portion of the radio spectrum previously unavailable to all but the most die-hard hobbyist.

Milcom Today

This band continues to be the most enjoyable and surprising part of all the channels I currently listen to. And finally, after

several years' drought, an authoritative frequency resource has been completely updated. Larry Van Horn has completely revised *Monitoring the Military* state by state, and the entire work will soon be available on CD from Grove Enterprises.

Now that we're speaking of the present, I highly recommend that everyone at least sample this segment of you have a scanner capable of doing so. In fact, some scanner-related websites even include audio links with MilCom VHF and UHF channels, so a new scanner isn't necessary for such a sample.

- Remember "Top Gun?" You'll hear the military combat range communications, air-to-air and air-to-ground, just like in the movie. It's even more exciting in real time and real life, even without Tom Cruise.
- Remember "M*A*S*H?" You'll hear the helicopter missions and ground support communications, with all of the drama and none of the comedy.
- Remember any of the hundreds of other war movies? If they used communications, you'll hear the real troops training for real missions: air combat, aerial refueling, bombing runs, forward air control, recon, rescue, ground support, base operations, and many other special assignments.
- With a good antenna system (including high-grade cable), you'll even hear satellites and the Space Shuttle (see this month's Fed Files), as well as flight tests and a wide assortment of mystery channels and callsigns. "Black Projects" and secret aircraft? Perhaps.

Air Force Bases and other military facilities are almost cities unto themselves. Units such as Law Enforcement, Fire-Rescue, Base Hospitals/Ambulances, Civil Engineering, various maintenance activities, schools, conference centers and recreational areas each utilize VHF and UHF land-mobile radio communications.

Unlike cities, however, many base units will coordinate their activities and support each other during exercises and emergencies. Monitoring these radio systems, both airborne VHF/UHF and land-mobile VHF/UHF, will provide a great deal of information and enjoyment...and restore the pride we used to feel for our military.

Prove it to yourself: listen in to MilCom and hear the dedication, discipline and precision in their communications, then compare that to the local dispatch channels you normally listen to. You'll find that MilCom will soon become your most enjoyable channels, too!

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Weather reports

Military Aircraft use these channels to communicate at local airports, for cross-country navigation, and during training missions. All freqs AM mode. For more detailed information, contact the author at wymanent@bellsouth.net

gation, and during training missions. An ireqs		207.400	key wesi wuxui Ali Siulioli	342.300	weather reports
AM mode. For more detailed information, con-		290.325	Miami International Airport	342.600	Air Combat Training
tact the author at wymanent@bellsouth.net		290.500	Aerial Refueling	343.000	Aerial Refueling
		291.600	Miami Air Route Traffic Control Center	343.600	Palm Beach International Airport
235.100	Aerial Refueling	292.200	Air Combat Training	343.700	Miami Air Route Traffic Control Center
238.900	Aerial Refueling	295.700	Homestead Air Reserve Station	344.200	Air Combat Training
239.300	Airport Control Towers (various locations)	298.900	Miami Air Route Traffic Control Center	344.600	Weather reports
243.000	Emergency Channel	301.500	Miami International Airport	346.300	Aerial Refueling
250.600	Air Combat Training	303.150	Homestead Air Reserve Station	348.600	Miami International Airport
251.000	NORAD	304.800	USAF, NOAA and NASA use during Hurricane Season	348.700	Miami Air Route Traffic Control Center
251.100	Miami International Airport	305.200	Key West Naval Air Station	348.900	Aerial Refueling
251.900	Air Force Rescue use	306.300	Miami International Airport	349.000	Miami Air Route Traffic Control Center
252.200	Air Mobility Command	306.400	NORAD	349.400	Air Mobility Command
255.400	FAA Flight Service Stations (various locations)	306.900	Miami Air Route Traffic Control Center	352.000	Aerial Refueling
255.600	Miami International Airport	306.975	Miami International Airport	353.600	Miami Air Route Traffic Control Center
256.700	Miami Air Route Traffic Control Center	307.100	Miami Air Route Traffic Control Center	353.900	Miami Air Route Traffic Control Center
256.900	Miami International Airport	307.200	Miami Air Route Traffic Control Center	354.100	Miami International Airport
257.700	Miami Air Route Traffic Control Center	307.300	Miami Air Route Traffic Control Center	355.600	Key West Naval Air Station
257.800	Airport Control Towers (various locations)	307.800	Aerial Refueling	360.200	Key West Naval Air Station
263.100	Miami Air Route Traffic Control Center	307.900	Miami Air Route Traffic Control Center	360.800	Opa-Locka Airport
263.200	NORAD	313.200	Key West Naval Air Station	363.050	Miami Air Route Traffic Control Center
264.600	Air Combat Training	317.400	Palm Beach International Airport	363.100	Aerial Refueling
264.625	Air Combat Training	317.700	Miami International Airport	363.200	Miami Air Route Traffic Control Center
265.000	Air Combat Training	318.500	Air Combat Training	364.200	NORAD
266.500	Aerial Refueling	319.000	Miami Air Route Traffic Control Center	370.900	Miami Air Route Traffic Control Center
269.050	Miami Air Route Traffic Control Center	319.100	Miami Air Route Traffic Control Center	372.200	Pilot-to-Dispatcher
269.300	Miami Air Route Traffic Control Center	319.700	Aerial Refueling	377.100	Miami Air Route Traffic Control Center
269.575	Miami International Airport	319.900	Miami International Airport	379.200	Aerial Refueling
269.900	Homestead Air Reserve Station	322.300	Miami International Airport	379.250	Miami Air Route Traffic Control Center
270.600	Air Combat Training	322.450	Miami Air Route Traffic Control Center	379.900	Miami International Airport
275.400	Air Combat Training	322.500	Miami Air Route Traffic Control Center	380.200	Miami International Airport
275.800	Airport Ground Control (various locations)	322.550	Miami Air Route Traffic Control Center	381.300	USAF Command Post (various locations)
276.500	Aerial Refueling	323.000	Miami Air Route Traffic Control Center	381.450	Miami Air Route Traffic Control Center
277.200	Key West Naval Air Station	323.100	Miami Air Route Traffic Control Center	381.700	Coast Guard
278.500	Miami Air Route Traffic Control Center	323.200	Miami Air Route Traffic Control Center	381.800	Coast Guard
280.200	Air Combat Training	324.600	Aerial Refueling	384.600	Palm Beach International Airport
281.500	Miami Air Route Traffic Control Center	327.600	Aerial Refueling	387.100	Palm Beach International Airport
282.800	Search and Rescue use	335.500	Miami Air Route Traffic Control Center	391.000	Aerial Refueling
283.900	Aerial Refueling	335.600	Key West Naval Air Station	397.900	Palm Beach International Airport
284.600	Palm Beach International Airport	336.400	Airport Ground Control (various locations)	398.900	Miami Air Route Traffic Control Center



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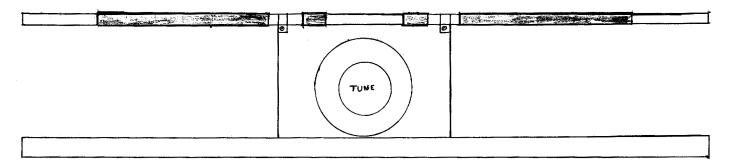
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A 36-inch MF Spectrum Loopstick Receiving Antenna

By Richard Q Marris G2BZQ

he Medium Frequency Spectrum covers from 300 to 3000 kHz (or 1000 meters to 100 meters). It thus takes in the medium wave AM broadcast band, the U.S. MEDFER experimental band, plus the amateur transmitting "Top Band" (1800 to 2000 kHz). In between, there are various navigational beacons, and other beacons. To which must be added commercial and other CW stations, etc. So, it will be seen that there is something for everyone – DX listeners, transmitting amateurs, and experimental enthusiasts.

All the above activities in the MF spectrum suffer greatly from interference from other stations (QRM), and from man-made and atmospheric noise (QRN). To eliminate this it is usually necessary to employ a highly directional antenna for receiving, such as a tuned loop, especially for those who live in heavily populated areas.

Tuned loops come in a variety of forms and sizes. For example, among the smallish loops are box loops, up to maybe 48-in. x 48-in.; spiral loops; and ferrite loops which are sometimes called loopsticks. Small versions of loopsticks will be found in your small portable radio, for use in the medium and long wave bands. These small ferrite loops consist of coils wound over a nickel zinc ferrite rod. Rotate your portable radio, and interfering stations and noise can often be eliminated or greatly reduced.

It is a function of ferrite rods that the larger the diameter of the rod, then the greater the sensitivity and also the directivity. However, if you lengthen the rod then the greater the directivity (nulling) achieved, accompanied by greatly increased sensitivity. In fact zero nulling can be achieved, except where the user lives adjacent to a high power transmitter.

So this 36-in. long loopstick antenna for the MF spectrum gives maximum nulling. It uses a 36-in. long x 3/8-in. diameter nickel zinc ferrite rod, which has to be fabricated by the constructor from shorter readily available rods (see later).

The Circuit is shown in Figure 1. It consists of coils L1 & L2 wound on the rod and tuned in a balanced circuit by variable capacitor C1A, which is half of a 2-gang variable capacitor. The other half (C1B) can be switched, with switch SW, to lower the frequency range.

The resulting frequency range is 400 to 3350 kHz on the prototype, achieved as follows;

ClA only = 3350 to 620 kHz C1A + C1B = 3350 to 400 kHz

The range can be extended to 300 kHz if required (see later). Coils L3 & L4, via the coaxial socket, are used to couple the loopstick to the receiver input.

The Unit Assembly is shown in

Figure 2. It is built onto a base 36-in. long x 5-in. wide x 1-in. deep. On the prototype, an inverted plastic plant pot tray was used, giving a lightweight, easy to use device. An alternative would be a lightweight timber frame, surfaced with thin plywood or plastic sheet. A piece of solid timber would be far too heavy and unwieldy.

At the front will be seen the 2 gang variable capacitor C1A/C1B. A 410 + 410 pf solid metal framed variable capacitor was used, with inbuilt slow-motion. A 500 + 500 pf would be advantageous, as it would extend the frequency range at the LF end. An external slow-motion drive could be fitted. A large diameter knob should be used.

At the center rear of the base, is mounted a 4-1/2-in. high x 7-in. wide insulated rigid plastic board. It is mounted vertically, as shown, using small metal brackets. The coaxial socket is fitted near the center bottom of this board. The 36-in. long x 3/8-in. diameter loopstick, encased in a 1/2-in. o/d rigid plastic tube (see Figure 3), is fitted along the top edge of the vertical board, with two PVC "P" clips secured with two screws, nuts and washers. The outer edge of the "P" clips would line up with the vertical edge of the vertical board. A small switch, SW, is fitted alongside ClB on the base.

Fabricating the 36-in. long ferrite rod

The rod material used is nickel zinc type 61 mixture. The prime supplier is Amidon. Associates*, and such rods are also advertised in the current catalogue of Antique Electronic Supply*. The suggested rod size is 7-1/2-in. long x 3/8-in. diameter. (Note: dimensions are quoted in inches - not metric).

Ferrite rods can be adhered together, end to end to produce longer rods. Also they can be cut with a small hacksaw, though the blades do not seem to appreciate this operation! Thus, for the 36-in. long rod, it is necessary to use 5-in. x 7-1/2-in. long x 3/8-in. diameter 61

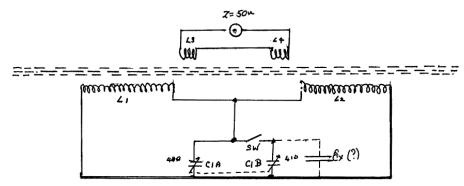
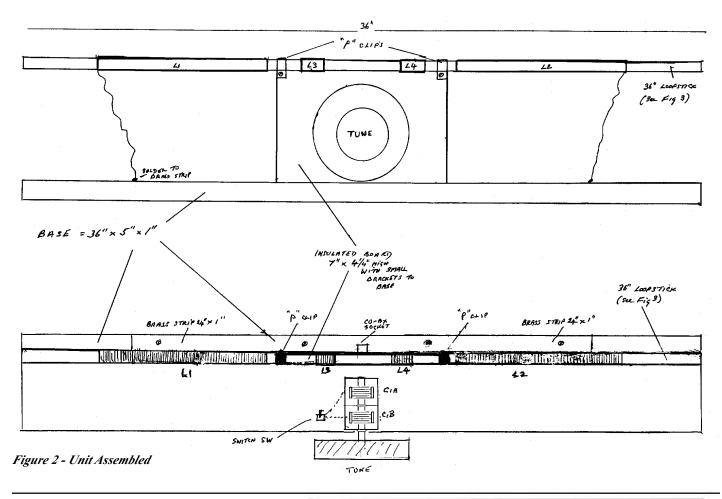


Figure 1 - Schematic





rods, with the surplus 1-1\2-in.cut off one of the rods before adhesion.

Each rod should be lightly cleaned by carefully rubbing down the ends on a sheet of abrasive paper laid on a flat surface. A Cyanoacrylene adhesive (e.g., Superglue) should be used. It gives a near unbreakable joint with rapid adhesion. Great care must be taken to line up the rod ends, as you do not get a second chance. Also keep the Superglue off the fingers. The best idea is to first stick the rods together in pairs, which are then stuck together to form the 36-in. long rod.

The rod is then inserted into a 1/2-in. o/d plastic tube, which becomes the coil former. Any 1/2-in. o/d rigid plastic tubing will do. The thicker the wall thickness the better, providing the inside diameter exceeds 3/8-in., so that the rod can be inserted. On the prototype, polycarbonate clear rigid tubing was used. This was obtained from a store specializing in supplies for tropical fish keepers.

The tube should be cut to 36-in. long. The ferrite rod on the prototype was wound with a few turns of masking tape, to make the ferrite rod a snug fit in the plastic tube. The ends of the tube (and rod) are then sealed by a few drops of hot candle wax.

(Notes: The ferrite rod should not be secured in the plastic tube until the coils LI to L4 have been wound and the system fully tested. An alternative suggestion for ferrite rod source supply is to find a supply of the older 8-in. long x 3/8-in. diameter ferrite rods which were popular some years ago. These can sometimes be found on the surplus market, complete with a medium wave (and long wave?) winding. These will probably be of a nickel zinc mixture of unknown grade. Providing they were intended for medium wave usage, they are well worth a try, as they come out cheap on the surplus market from time to time. However, the performance at the HF end of the loopstick may be below that obtained with the 61 mixture rods.

Winding LI - L4

The wire used, in all cases, is PVC cov-

ered hookup wire (24/0.2) 2.06 mm outside diameter. This type of wire makes coilwinding easy, as, when closewound, it automatically spaces the wire turns. Winding turns are therefore closewound, as laid out in Figure 3.

Ll is wound *anticlockwise*, starting one wire width, to the left of the lefthand "P" clip. Ll consists of 84 turns.

In a similar manner L2 is *clockwise*, wound with 84 turns, starting one wire diameter width from the right hand "P" clip.

Coupling coils L1 and L4 are next wound *clockwise* as shown in Figure 3. Each consists of 11-1/2 turns exactly 3-in. apart. The two inner ends are connected together, as shown, and the outer ends will drop down to the coaxial socket.

All coil ends should be anchored with a spot of adhesive or tape.

The Final Assembly

(see Figure 2)

Before fitting the 36-in. long loopstick, a 24-in. x 1-in. thin strip of brass should be screwed to the base, behind the vertical board. A narrow strip of the same brass should be cut and run from the main body frame of the variable capacitor and soldered at both ends.

Next fit the loopstick, along the top edge of the vertical board, by using two PVC 1/2-in. "P" clips.

Drop the ends of L1/L2 down, and solder to the brass strip. The inner ends of L1/L2 should be taken to C1A and soldered (see circuit). The inner ends of L3/L4 are soldered together. The outer ends of L3/L4 are taken to the inner and outer connections of the coaxial socket, and soldered.

A small switch (SW on circuit) is fitted near C1A/C1B and connected as shown in circuit. As an alternative a short alligator clip lead could be used.

Testing

Connect the loop to the receiver antenna input socket, using maybe 4 feet of RG58 feedline. With C1A (only) in circuit, locate the actual frequency range of the loop by us-

ing the receiver calibrations. The loop should be brought to resonance on a convenient signal. Resonance is indicated by a increased signal strength. Rotate the loop, until the signal increases dramatically, as the flat side of the loop points towards the station being received. Rotate the loop through 90 degrees. The signal should now be no longer audible. Continue this operation until the loop has been thoroughly tested over the whole frequency range; at the same time recording the range by means of the receiver calibrations.

If C1B is switched in, then this will drop the LF bottom frequency to about 400 kHz. The actual frequency will depend on the capacity of C1A/C1B. On the prototype a 410 + 410 pf two-gang variable capacitor was used. A 500 + 500 pf is likely to be more readily available, and the extra capacity will lower the LF frequency end of the loop range.

A further drop down to 300 kHz may be achieved by adding additional capacity "CX" across C1B. This can be a ceramic or silver mica capacitor of 200 pf (CX).

In operation, it will be found that the nulling can be quite dramatic, thus eliminating (or very greatly reducing) both QRM & QRN. Whether an RF preamplifier should be used will depend on the performance of the individual receiver. Such preamplifiers can be purchased at relatively low cost, or a wideband preamplifier can be made up using one of the many published circuits.

Remember: All connections should be securely soldered. Do not use mechanical connections.

Suppliers of 61 mixture Nickel-Zinc Ferrite Rods

- Amidon Associates Inc., P.O. Box 25867, Santa Anna, California 92799, U.S.A.
- Antique Electronic Supply, 6221 S. Maple Avenue, Tempe, AZ 85283 USA.

Remember:- The ferrite rods required are 61 mixture 7-1/2-in. long x 3/8-in. diameter. Quantity - 5.

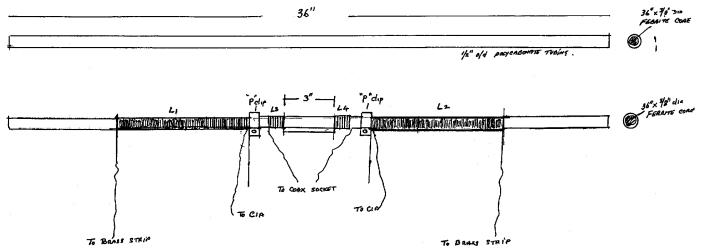


Figure 3 - Ferrite Rod/Coil Assembly

The linear loaded quad is set up in the side yard only a few feet off the ground. Operational tests show the advantage of this design, as described in the text.

A Linear Loaded Quad for 15 MHz

By Douglas A. Blakeslee, N1RM

f the various antenna choices available to the monitor looking for improved performance, the quad (also known as the quad loop) has some distinct advantages. The primary three are low noise pickup because the loop is a closed system, higher gain than a dipole cut for the same frequency, plus a lower angle radiation pattern for good long distance (DX) performance.

The quad antenna was pioneered for shortwave service at HCJB in Ecuador, the religious broadcaster that has been the "Voice of the Andes" for over 50 years. Their transmitting site above Quito was so high, yet moist, that static discharge from linear elements such as dipoles was a major problem. The quad loop was the answer for this broadcaster.

10'

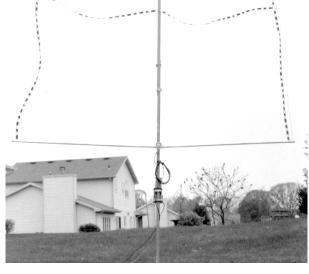
10'

4' 9"

520hm

Coax

Fig. 1 — The generalized drawing of the linear loaded quad shows the configuration.



Anyone who has tall trees or who can put up tall masts can build a quad. However, once installed, it is only bidirectional. For performance on the 15 MHz and higher bands, a quad that is rotatable can be made from inexpensive, light-

weight, available components. The first model built by this writer was for 15 MHz as this was the largest size considered possible for a lightweight quad. It was the best test for mechanical stability of a very light weight antenna.

The According to ARRL Antenna Book,1 the quad has additional advantages because "it introduces very little loss, does not degrade directivity patterns, and has a low Q to allow reasonable bandwidth." That is high praise! (The Q of an antenna is a measure of its bandwidth, which generally doesn't need to be high. The higher the Q, the narrower the bandwidth over which the antenna can be utilized.)

The Linear-Loaded Quad

A long-time friend, David Courtier-Dutton (G3FPQ), designed a 7-MHz (40 meter) 2-element quad beam antenna which was described in *QST*² and several editions of *The ARRL Handbook*. Mark Twain wrote, "thunder? thunder is impressive but it is the lightning that does the work." To apply Twain to antennas is a bit of a stretch, but the high current portion of the antenna is the lightning and the high voltage portions are the thunder. G3FPQ kept the high current portions intact

while folding back the high voltage sections back on themselves, creating "linear loading," reducing the size of the quad by approximately 40 percent.

A full sized quad for 15 MHz would be over 18 feet on a side, difficult to build and to handle. With linear loading, the quad comes down to approximately 10 x 12 feet, an antenna much easier to construct and to rotate.

Antenna Construction

The linear-loaded quad is built from two pieces of electrical conduit as the main elements at the top and bottom of the antenna. The general design of the antenna is shown in Fig. 1. The supporting mast is made from a 1-1/4-inch piece of wood dowel, 10-feet long. The center support needs to be nonconductive to prevent detuning the antenna. A 5-foot piece of antenna mast (RS 15-842) and two U bolts (RS 15-826) finish the mast for insertion into the mount or rotator.

A number of small plastic rectangles are employed to provide mounting of the connecting wires and to provide insulation. Diagram of these pieces are shown in Fig. 2. A visit to a local plastic supply and a good smile can produce the material needed, as it usually goes into the scrap bin. Or a piece of acrylic or polycarbonate sheet can be purchased and cut up with a small saw. Acrylic should be at least 3/8-inch thick, while polycarbonate 1/8-inch thick or more is appropriate. Next, the holes shown in Fig. 2 are drilled.

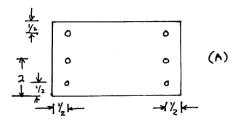
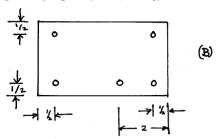


Fig. 2 — Spacers are cut from Lexan or acrylic sheet stock. All holes are 3/16 inch diameter. Connection hardware are no. 6, with brass types utilized for all points carrying radio frequency (RF) energy.



Any connection that must carry part of the antenna electrical circuit should be made with brass hardware, available at most hardware stores. Bolts used for mounting only do not need to be brass. Wire connections should be soldered at each point; the best approach is to use solder lugs where each wire terminates at a brass bolt.

The main loaded elements are made with 450-ohm, open wire line. ³ The other two side elements are insulated wire, no. 18 to 22 gauge. A thicker gauge wire (no. 12) was first tried, and it was found to be so heavy that it tended to break in high winds.

Impedance Matching

To extract or input the maximum energy to or from an antenna, the impedance of the connecting cable needs to be matched to the antenna's impedance. A full size quad has a natural impedance of 90 ohms. Calculations indicate that the linear-loaded quad should be approximately 40 ohms in free space. Close to the ground, these numbers can change. Direct connection eliminates the complexity of matching circuits.

The quad loop is a balanced antenna while the coax feed is unbalanced. A simple solution to protect the balance of the loop is to wind the feedline into a five-turn loop approximately 8 inches in diameter. The coax forms a simple balun transformer. Of course, a purchased unit can also be used, but a simple coil of feedline cable is tough to beat in cost.

Antenna Results

The linear-loaded quad was set up in the side yard on a 5-foot piece of TV mast driven approximately 2 feet into the ground. A TV quality rotator (RS-15-1225) was added so that the position of the antenna relative to the signal source could be evaluated. A reference antenna was a 100-foot-long wire antenna some 30 feet high, fed through a transmatch, with some 20 ground radials. A coaxial switch allowed quick changeover between the two antennas for fast comparison.

HF antenna measurements are very difficult even under the most controlled conditions, as noted by Bob Grove in *MT* a couple of years ago. Even fully instrumented antenna ranges don't always yield consistent results. The following notes should be taken as observations only, repeated often enough to lend

some credibility.

- 1. The quad has lower noise pickup as advertised. Tests using a receiver S meter calibrated with a signal generator indicated the quad was approximately 10 decibels (dB), almost two S units, lower in local noise pickup vs. the reference long wire antenna.
- 2. The quad antenna seems to have better response to long distance (DX) signals. The quad antenna was located only 3 feet off the ground, which indicates how a closed loop is less affected by its surroundings than linear antennas.
- 3. Because the antenna is fed directly via 50-ohm coaxial cable, it can also be used on other bands. It was tried on 7 and 21 MHz for ham radio contacts. Utilizing a transmatch (also called an antenna tuner) to match impedances, some 20 countries were worked on 21 MHz in one day.

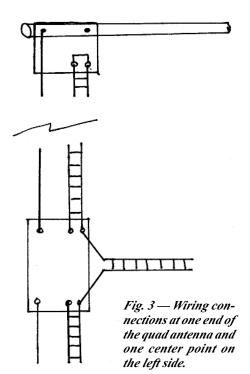
In monitoring the 9 and 11 MHz bands, the antenna's general ability to produce a null of signals off the sides of the antenna were noticeable, even though the quad was built for 15 MHz. In the end, the ability of a rotatable antenna to reduce the level of interfering signals may well be its most important characteristic.

Footnotes

¹Rashed and Tai, "A New Class of Wire Antennas," 1982, *International Symposium Digest on Antennas and Propagation*, Vol.2, IEEE. Also, R. Dean Straw *et all, The ARRL Antenna Book*, "linear loading," pgs. 6-19 to 20, 1997, ARRL.

²David Courtier-Dutton, G3FPQ, "Some Notes on a 7-MHz Linear Loaded Quad," pgs. 14 and 15, *QST*, February 1972.

³ Cable X-Perts, Inc, 416 Diens Drive, Wheeling, IL 60090. Tel. 847-520-3003.





B. The lower section of the antenna is split into two parts to form a feed point for 52-ohm cable. A coil of coax cable provides a balun transformer to make an unbalanced feedline work with a balanced loop, as described in the text.



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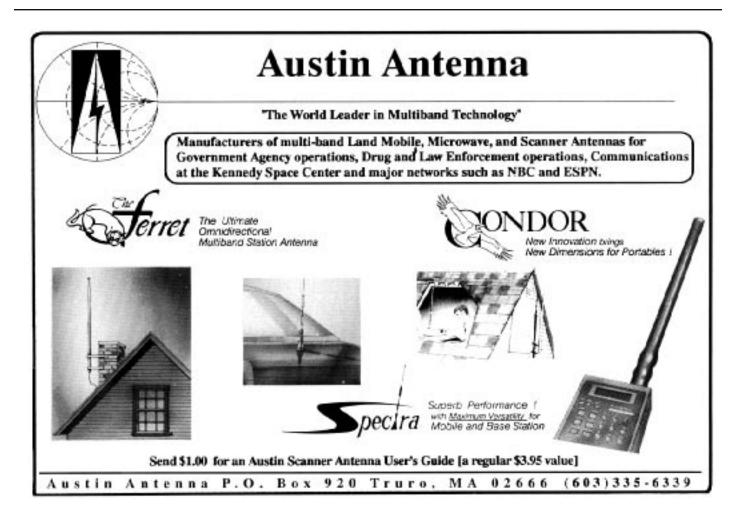
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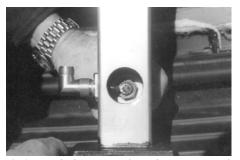


Who says you can't take it with you!

By Arthur R. Lee WF6P

hen my ham radio buddy Don Moore, WA6BJJ, bought a new model Sports Utility Vehicle, there was no possible place to mount his High Frequency (HF) antenna. He easily set up a through-the-window mounted antenna for his two-meter/440 antenna, but his Hustler vertical HF antenna was too big for that approach. Modern-day plastic covered bumpers and the sweeping lines to his SUV had him stymied. Wanting to continue with his on-the-air contacts while operating mobile, he came up with a handy solution that most of us can adopt when faced with the same situation.

He obtained a twelve-inch section of hollow, two-inch square, stainless steel stock from a metal shop to fit his standard trailer hitch. Don cut two one-inch access



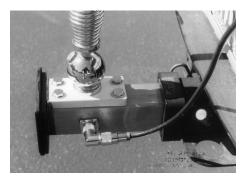
1. Access holes are cut into the mount to allow for soldering and attaching the antenna base and coax connectors.

holes in the stock. The first hole was for the mounting of the antenna spring base connection (Photo 1).

A durable piece of flat plastic was used to insulate the antenna mount from the stainless stock. A panel receptacle (SO-239) was attached at a third hole, with the center connector soldered to the antenna feed point (Photo 2). For mild steel stock, the mounting bolt or screw holes could be drilled and tapped. For this stainless steel



2. The coax connector centerpost is soldered to the antenna terminal spade connector.



3. The completed trailer hitch antenna.

piece, however, the holes were drilled through and nuts and lock washers attached to the bolts. An additional hole in the square stock was drilled for a lock pin to hold it securely in the trailer hitch.

Drilling of holes through stainless steel requires cutting oil and a drillpress



4. The assembled antenna after a very dusty (and successful) road test.

operated at slow speed. Drilling through mild steel is easier and only requires the use of a light oil coolant to reduce heat on the drill bit.

The fold-over Hustler antenna was attached to the spring mount for a very clean installation (Photo 3). The vertical element and coil project several feet above the SUV's roof, so

preventing the antenna from bending rearward from wind loads while driving was necessary. This antenna was tethered to the

roof rack with a short length of nylon cord (Photo 4).

On bumper mounted antennas I have used in the past, I preferred to use two lengths of 20 pound test monofilament fishing line tied in a vee fashion to either a roof rack or my trunk lid edges. With the breakaway monofilament fish-



5. The RG-8U coax is fed to the antenna through the seal in the rear cargo door.

ing line, an unplanned-for snag from a tree or low lying bridge or parking garage will not damage the antenna too badly. When the monofilament fishing line breaks, the antenna can bend back against the natural action of the vertical spring support.

For easy operating access, the HF rig was mounted on the transmission console between the driver and front seat passenger. The RG8U coax connecting the HF transceiver to the antenna was led back under the carpeting through the passenger compartment to the rear-loading door. To prevent drilling a hole in the body of the vehicle, the coax passed out through the soft rubber seal at the lower part of the door (Photo 5).

The antenna elements and traps for different bands are stowed inside the vehicle when not in use (Photo 6). The trailer hitch antenna mount is easily removed for storage or when replaced by the actual trailer hitch and ball for towing (Photo 7).



6. Coils and the foldover antenna elements are stowed in the vehicle for use on various frequencies.

Although Don is an excellent CW operator,

his wife will not let him pursue that part of his ham radio hobby by operating his straight key while driving down the freeway. She makes him use his microphone on voice frequencies only! Of course, when she is not with him ...?



7. By pulling out the lock pin, the unit can be easily removed when not in use.

Scanning Florida's Space Coast

By John Mayson photos by Harry Baughn

11 = 867.7625

n the March issue, MT readers took a trip down I-4 and across central Florida. But we barely bypassed some of the most popular beaches and sights just to the south of our starting point at Daytona Beach. We also neglected to warn motorists that in Florida, unless you are a licensed ham, it is illegal to mount a scanner in your car.

For everything connected to monitoring NASA launches, consult the newly-updated and comprehensive *Monitoring Times* website *http://www.grove-ent.com/nasa.html* compiled by Assistant Editor Larry Van Horn.

Brevard County

Florida's Space Coast is home to the Kennedy Space Center, one of the largest sea turtle nesting grounds, and about eighty miles of Atlantic Ocean coastline. The closest beaches to Orlando are in Brevard County. Viera is now the county seat and Palm Bay is the largest city. Along with miles of desolate, beautiful beach, the Brevard Zoo in Viera and Kennedy Space Center Visitor's Center attract many visitors.

Brevard operates an EDACS TRS used by all county and city agencies. Brevard is about 80 miles north-to-south and only about 15 to 20 miles east to west. In order to cover such a vast area, three repeaters were built: Titusville (north), Rockledge (central), and Palm Bay (south).

North Site Frequencies

1=866.2125 2=866.8250 3=868.1625 4=868.7375 5=866.2625 6=866.5500 7=868.4125

8=868.6875 9=866.7625



17 — 848 5125				
Central Sit	e Freq	vencie	s	
3=866.6250		390		
4=868.5375				
8 = 868.8500				
9=867.1250				
10=867.3750				
				26
12=007.0750				
South Site	Freque	encies	100	
1 = 866.1250	A-35			
	1	- 4		
. // // // Complete	A Comment	archel in	A STATE OF	S. San
6=868.3750				
7=868.5625				
11 = 866.6750				
12 = 866.9000				
17 = 857.7625				
18 = 858.7625				
19=859.7625				
	12=868.5125 Central Sit. 1=866.0750 2=866.3250 3=866.6250 4=868.5375 5=868.7875 6=866.1875 7=868.6000 8=868.8500 9=867.1250 10=867.3750 11=867.6250 12=867.8750 South Site 1=866.1250 2=866.5875 3=867.0375 4=868.0750 5=866.2500 6=868.3750 7=868.5625 8=868.8125 9=866.3000 10=866.3750 11=866.6750 12=866.9000 13=867.5375 14=866.5625 15=868.6250 16=856.7625 17=857.7625	12=868.5125 Central Site Frequence 1=866.0750 2=866.3250 3=866.6250 4=868.5375 5=868.7875 6=866.1875 7=868.6000 8=868.8500 9=867.1250 10=867.3750 11=867.6250 12=867.8750 South Site Frequence 1=866.1250 2=866.5875 3=867.0375 4=868.0750 5=866.2500 6=868.3750 7=868.5625 8=868.8125 9=866.3000 10=866.3750 11=866.6750 12=866.9000 13=867.5375 14=866.5625 15=868.6250 16=856.7625 17=857.7625 18=858.7625	12=868.5125 Central Site Frequencie 1=866.0750 2=866.3250 3=866.6250 4=868.5375 5=868.7875 6=866.1875 7=868.6000 8=868.8500 9=867.1250 10=867.3750 11=867.6250 12=867.8750 South Site Frequencies 1=866.1250 2=866.5875 3=867.0375 4=868.0750 5=866.2500 6=868.3750 7=868.5625 8=868.8125 9=866.3000 10=866.3750 11=866.6750 12=866.9000 13=867.5375 14=866.5625 15=868.6250 16=856.7625 17=857.7625 18=858.7625	12=868.5125 Central Site Frequencies 1=866.0750 2=866.3250 3=866.6250 4=868.5375 5=868.7875 6=866.1875 7=868.6000 8=868.8500 9=867.1250 10=867.3750 11=867.6250 12=867.8750 South Site Frequencies 1=866.1250 2=866.5875 3=867.0375 4=868.0750 5=866.2500 6=868.3750 7=868.5625 8=868.8125 9=866.3000 10=866.3750 11=866.6750 12=866.9000 13=867.5375 14=866.5625 15=868.6250 16=856.7625 17=857.7625 18=858.7625

Brevard County Sheriff's Office Talkgroups

20 = 860.7625

AFS	Chan -	Description
01-000		Agency Call
01-010		Patrol Fleet Call
01-011	1	North Dispatch
01-012	2	Central Dispatch
01-013	3	South Dispatch
01-014		Teletype
01-015		Tac
01-016		Supervisor
01-020		Agent Fleet Call
01-021		CID
01-022		Homicide
01-023		SID
01-024		GEE TOO
01-026		Drug Task Force

01-030	lac Fleet Call
01-031	North Tac
01-032	Central Tac
01-033	South Tac
01-034	MAN
01-037	M/A ERT
01-040	AOA Fleet Call
01-041	Countywide
01-042	M/A ERT
01-044	EOC
01-045	ERT 1
01-046	ERT 2
01-047	Vice
01-050	Sheriff Fleet Call
01-051	Command
01-052	Court W/A
01-053	Training Tac
01-054	FARM Ops
01-055	SWAT 1
01-056	SWAT 2
01-050	Tac Fleet Call
01-064	State Attorney's Office
01-080	EOC Fleet Call
01-000	EOC A
01-001	EOC B
01-002	EOC C
01-003	EOC D
01-064	EOC D
01-003	Alert Fleet Call
01-070	Alert 1
01-091	Alert 2
01-072	Alert 3
	Alert 4
01-094	
01-095	Civil
01-096	Warrants
01-097	AG Marine
01-140	Police 1 Fleet Call
01-147	Police North
01-150	Police 2 Fleet Call
01-156	Police Central
01-157	Police South

01-027

01_030

MAN

Tac Floot Call

Brevard County Fire-Rescue Talkgroups

AFS	Description
03-000	Fire Agency Call
03-010	Fire Fleet Call
03-011	North Fire Dispatch
03-012	Central Fire Dispatch
03-013	South Fire Dispatch
03-014	North Emergency Management
03-015	Central Emergency Management
03-016	South Emergency Management
03-017	Paging

03-020	EMS Fleet Call
03-021	North EMS Dispatch
03-022	Central EMS Dispatch
03-023	South EMS Dispatch
03-030	Ops '
03-031	Tac 31
03-032	Tac 32
03-033	Tac 33
03-024	North Lifeguards
03-034	Central Lifeguards
03-025	South Lifeguards
03-040	Fire Tac Fleet Call
03-041	Tac 41
03-042	Tac 42
03-043	Tac 43
03-044	
03-050	EMS Tac
03-051	Tac 51
03-052	Tac 52
03-053	Tac 53
03-054	EMS Wide Area
03-060	Admin Wide Area
03-061	Agency Wide Area
03-062	B/U Wide Area 1
03-063	B/U Wide Area 2
03-064	B/U Wide Area 3
03-070	Training & Prevention Fleet Call
03-071	North Training
03-072	Central Training
03-073	South Training
03-074 03-075	North Prevention Central Prevention
03-075	South Prevention
03-076	Comm 1
03-077	Mutual Aid Fleet Call
03-000	North Mutual Aid
03-001	Central Mutual Aid
03-002	South Mutual Aid
03-100	Car-to-Car Fleet Call
03-101	North Car-to-Car
03-102	Central Car-to-Car
03-103	South Car-to-Car
	555 5a. 10 cui

Beachside Talkaroups

beachside		isiae	luikgroups
	AFS	Chan	Description
	10-000		Beaches Agency Call
	10-010		City Beach 1 Fleet Call
	10-011	1	Indian Harbour Beach Police Dispatch
	10-012	2	Satellite Beach Police Dispatch
	10-013	3	Indialantic Police Dispatch
	10-014	4	Beaches Police
	10-020		City Beach 2 Fleet Call
	10-021	5	Beaches Police
	10-022	6	Beaches Police
	10-023	7	Beaches Police
	10-030		City Beach 3 Fleet Call
	10-031	1	Indian Harbour Beach Fire Dispatch
	10-032	2	Satellite Beach Fire Dispatch
	10-033	3	Indialantic Fire Dispatch
	Cape	Cana	veral Talkaroups

AFS Description 03-035 CCVFD Tac

Cocoa Police Talkgroups

AFS	Describitori
11-020	Patrol Fleet Call
11-021	0ps
11-022	Teletype
11-023	Tac 1
11-024	Tac 2

11-025 11-026 11-027 11-030 11-031 11-040 11-041 11-042 11-043 11-044	Wide Area Cocoa/Rockledge Mutual Aid Dispatch CIS Fleet Call CID SID Admin Fleet Call Admin Supervisor SRT-L SRT-W
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Cocoa Fire Talkgroups

Cocoo	ı rıre laikgro
AFS	Description
11-050	Fire Fleet Call
11-051	Dispatch
11-052	Tac 1
11-053	Tac 2
11-054	Backup
11-060	Command Fleet Call
11-061	Mutual Aid
11-062	Admin

Cocoa Beach Police Talkgroups

	Deach Fo
AFS	Description
12-030	Police 1 Fleet Call
12-031	Dispatch
12-032	Tac 1
12-033	Tac 2
12-034	Supervisor
12-035	Teletype
12-040	Police 2 Fleet Call
12-041	Events
12-022	Wide Area
12-023	Wide Area
12-024	EOC

Cocoa Beach Fire Talkgroups

	a beatii i
AFS	Description
12-010	Fire 1 Fleet Call
12-011	Dispatch
12-012	Tac 2
12-013	Tac 3
12-014	Supervisors
12-020	Fire 2 Fleet Call

Malabar Fire Talkgroups

AFS	Description
04-101	Dispatch
04-102	Tac 1
04-103	Tac 2

Melbourne Police Talkgroups

AFS	Description
08-010	Fleet Call
08-011	Teletype
08-012	Primary
08-013	Talkaround
08-014	Tac
08-015	Investigations
08-016	Narcotics
08-017	TRS0
08-020	SPC
08-021	Command
08-022	Wide Area
08-023	Vice
08-024	Investigation
08-025	Vice
08-026	Narcotics

08-027 SWAT 08-031 MDT

08-054 Fire/Police Shared

Melbourne Fire Talkgroups

AFS	Description
08-050	Fleet Call
08-051	Primary
08-052	North
08-053	South
08-054	Fire/Police Shared
08-055	Training
08-056	Admin
08-057	Wide Area

Melbourne Airport Talkgroups

MICIB	••••	c An pon n
AFS	Chan	Description
08-063	1	Police
08-065	2	Police
08-066		Airport Authority

Palm Bay Police Talkgroups AFS Chan Description

09-010		Patrol Fleet Call
09-011	1	Patrol
09-012	2	Patrol
09-013	3	Patrol
09-014		Teletype
09-015		Command
09-017		ERT 2
09-020		Investigations Fleet Call
09-021		Special
09-022		Log In/Out
09-023		Training 1
09-024		Training 2
09-025		CID
09-026	1	SID
09-027		Investigations
09-031		Fire/Police Shared
09-032	1	Citywide
09-033	2	Citywide
09-037		V-COPS
09-040		Supervisors
09-041		Staff
09-042		Supervisors
09-043	2	SID

Palm Bay Fire Talkgroups

SRO S

Special

Palm Bay 1

AFS	Description
09-060	Fire 1 Fleet Call
09-061	Fire Primary
09-062	Tac 2
09-063	Tac 3
09-064	Tac 4
09-065	Tac 5
09-066	Tac 6
09-067	Tac 7
09-070	Fire 2 Fleet Call

09-044

09-050

09-051



09-071	Tac 8
09-072	Tac 9
09-073	Tac 10
09-074	Tac 11
09-075	Training 1
09-076	Training 2
09-077	Maintenance
09-080	Fire 3 Fleet Call
09-081	Maintenance 2
09-082	Chief
09-083	Citywide
09-031	Fire/Police Shared

Rockledge Police Talkgroups

AFS	Description
06-010	Patrol Fleet Call
06-011	Patrol
06-012	Alt 1
06-013	Alt 2
06-014	Supervisor
06-016	Court
06-020	Special Crimes Fleet Call
06-021	CID
06-022	CID Private
06-023	Tac 1
06-024	Training
06-025	Admin
06-026	Emergency

Rockledge Fire Talkgroups

AFS	Description	
06-015	Primary	
06-060	Fire Fleet Call	
06-061		
06-063	Fire Tac 1	
06-064	Fire Tac 2	
06-065	Fire Tac 3	
06-066	Special Ops	
06-067	Admin	
06-064 06-065 06-066	Fire Tac 2 Fire Tac 3 Special Ops	

Titusville Police Talkgroups

11103	me i	ronce ic
AFS	Chan	Description
07-040		Fleet Call
07-041	1	
07-042	2	
07-043		Teletype
07-044		ER
07-045		Tac 3
07-046		Admin
07-051		CIS
07-052		SIS
07-053		Tac 4
07-054		Tac 5
07-055		Tac 6
07-056		Voice Guard
07-057		Admin

Titus	ville Fire Talkgroups
AFS	Description
07-010	Tac Fleet Call
07-011	Tac A
07-012	Tac B
07-013	Tac C
07-014	Tac D
07-015	Tac E
07-016	Tac F
07-017	Tac G
07-020	Admin Fleet Call
07-021	Admin
07-022	Prevention
07-023	Training

07-024 07-030	Car-to-Car Station All	
07-031 07-032	Station 10 Station 11	
07-033 07-034	Station 12 Station 14	
07-035	Headquarters	

West Melbourne Police Talkgroups

AFS	Descripti
01-025	SID
01-043	City Tac
01-065	SID

MEDCOM

AFS	Description
04-140	Hospital 1 Fleet Call
04-141	Holmes Regional Medical Center
04-142	Cape Canaveral Hospital
04-143	Titusville Medical Center
04-144	Wuesthoff Hospital
04-145	Palm Bay Hospital
04-146	Wide Area
04-147	Patrick AFB Medical
04-150	Hospital 2 Fleet Call
04-151	Kennedy Space Center Medical
04-152	Holmes Regional Medical Center Security
	-

Osceola County

Osceola lies south of the city of Orlando. Kissimmee and St. Cloud are the gateway to the Orlando theme parks, offering affordable lodging near Disney World, Sea World, and Universal Studios Florida. Most of the county is rural and consists of citrus groves.

Osceola County operates a Motorola TRS that all city and county agencies use.

Osceola County Trunked Radio System

Motorola Type II Analog Frequencies 856.2125 856.7125 856.7375 856.9375 857.2125 857.7125 857.7375 857.9375 858.2125 858.7125 858.7375 858.9375 859.2125 859.7125 859.7375 859.9375 860.2125 860.7125

860.7375

860.9375

Osceola County Sheriff's Office

iaikgroups			
Talkgroup	Description		
272	West Patrol		
784	East Patrol		
528	Teletype		

1040	Support
1296	Tactical 1
2064	Tactical 2
2928	Law Enforcement Net
1552	Comm Channel
1744	Civil Division
1776	Courthouse Security
2576	County Jail

Kissimmee Police Talkgroups

Talkgroup	Description
3216	Patrol
3248	Teletype
3280	Tac 1
3312	Tac 2
3311	

Kissimmee Fire Talkgroups

Talkgroup	Description
3600	Dispatch
3632	Tac 1
3664	Tac 2
3696	Tac 3
3728	Tac 4

St. Cloud Police Talkgroups

Talkgroup	Descriptio
4880	Patrol
4944	Tac 1
4912	Admin
5072	City Net

St. Cloud Fire Talkgroups

Talkgroup	Chan	Description
5104	Tac 1	Dispatch
5136	Tac 2	EMS Response
5168	Tac 3	Fire Reponse

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Beginner's Corner

Ken Reitz. KS4ZR ks4zr@firstva.com

Satellite TV Update: CBC Woes, Scheduled Launches, MPEGII Report

s most of you are aware, the satellite TV column in MT is no longer produced. Instead, I'll be updating the satellite TV industry every four months or so in this column. And, since it's been four months since the last edition of "The Launching Pad," here's the latest info on satellite TV monitoring.

CBC Continues Plummet

Canada's domestic television service continues its steep downward spiral as budget cutbacks year after year take their toll. Once the very model of a national domestic TV network, the CBC has finally ceased all broadcasts via Cband satellite television on Anik E2. Canadian viewers must now rely on their local TV channels (if they can get them), or small dish satellite and cable service (if they can afford them).

Gone in particular are the Atlantic, Eastern and Pacific feeds of the CBC domestic service including a half dozen radio stations from Toronto and Montreal. Affected by this loss are tens of thousands of North Americans who have spent the better part of the last 20 years enjoying the Canadian alternative to the all-too-predictable American networks. Outstanding shows such as "This Hour Has 22 Minutes," "Venture," "Marketplace," and "Royal Canadian Air Farce" follow in the wake of the acclaimed "Midday" which left the network last year in what was, in fact, a glimpse of the CBC's gloomy future.

Still available via MPEGII on E2 are CTV programs, CBC Newsworld International, The Weather Network and three radio stations CITE, CKAC and RFI. Also available on the Ku-band side of Anik E2, in DigiCipherII mode, is StarChoice channel 299, which is an info channel for the StarChoice system. Sports scores, weather and news items are found here.

Satellite Launch Update

Launch activity in the satellite TV world has been very active over the last several months. Anik F1, launched in late November of last year (36 C-band and 48 Ku transponders), takes its place at 107.3 ° W. GE8 was launched at the end of December last year and replaces Satcom C5 at 139°W with just 24 C-band transponders. By the time you read this **PAS1R** will have replaced PAS1 at 45°W with 36 C and 36 Kuband transponders. Look for additional MPEGII Free-To-Air transmissions aimed at North America when this satellite goes into service.

Scheduled launches as of publication date include GE9 which will be used as an in-orbit spare for GE7 and GE8. Telstar 9 will be a C/ Ku satellite located at 69°W and should launch the first week of this month. Galaxy 3C will launch in June and carry 24 C and 48 Ku-band transponders. It will replace Galaxy 3R at 95°W.

In other launches of interest *DirecTV 5* will launch next month and be located at 119°W. XM Radio's first two satellites, XM Rock (115°W) and XM Roll (85°W) will be up and in testing mode by the time you read this. XM Radio is one of two FCC licensed DARS (satellite radio to car) services expected to be blitzing your senses with ad campaigns this summer. We'll

> all experience a level of hype not seen since the early days of small dish satellite TV.

> Looking down the long launch road there are other items of note. Intelsat 903 (24.5°W). Intelsat 904 (34.5°W) and Intelsat 905 (27.5°W) are all slated to be launched at the end of this year. Each will carry 44 C-band and 12 Ku-band transponders which represents a huge increase in transponder availability for the year 2002. Also in 2002 watch for Kaband satellites in North American skies at 73°W, 85°W, 105°W and 77°W.



Multiple feeds allow one dish to "see" several satellites at the same time without moving the dish. (Courtesy: Global Communications)

One intriguing satellite, Anik F2 (111.1°W) will carry 52 Ka-band, 32 Ku-band and 24 C-band transponders. GE1i will launch in early 2003 to be placed at 47°W and carry a whopping 72 Cband transponders. That same year Inmarsat will see new satellites at 54°W and 64°E.

More MPEGII Info

MPEGII Free-To-Air (FTA) signals continue to dominate the action on both the C and Ku-bands on virtually all satellites which can be seen in North America. Of note recently has been the switch from analog to MPEGII back haul transmissions for U.S. broadcasting giant CBS on the Ku-band side of its main satellite Telstar 6. CBS joins NBC which has used MPEGII technology for several years to do its news and sports back hauls. NBC's single NTSC feed on Satcom F1 has been replaced by several MPEGII time zone feeds which are encrypted.

PAS9 (formerly PAS5) at 58°W continues to be the place for international programming. Numerous feeds from NHK Tokyo, CCTV Beijing, and BBC London, are found here in addition to single full time feeds from RTP Portugal, DWTV Germany, Arirang TV Korea, and a part time feed from Cuba. Full time radio broadcasts from China Radio International (including transmissions in Russian), DW1, DW2, DW7. RDP Antena 1. RAI International as well as EWTN Catholic Radio and WACC-AM Miami are also found here.

The mother lode of foreign FTA MPEGII transmissions are found on NSS806 at 40.5°W including Solo Tango, Red Latina, NITV (Iran), Iraq Satellite Channel, Syria Satellite Channel, TV 5 France/Belqique/Suisse, Kuwait Space Channel, WorldNet Europe and WorldNet Latin



Satellite TV enthusiast's dream dish farm belongs to Mike Kohl of Global Communications. (Courtesy: Global Communications)

America & Africa. Other channels include MCM Europe, Fashion TV, and Video Italia. Radio services on NSS806 include Voice of America, VoA News Now, VoA Music Mix, Radio Italia. Syrian Radio, Radio Monte Carlo, five feeds of RFI including English, Afrique, Antilles, Musique, Diverse, RCN Radio, Met Opera (U.S. Naval Observatory Master Clock), Radio Capital 104.5, Radio Popular, Radio Nacional de Venezuela, Circuito CNB 102.3, Radio Capital AM, Radio Panamericana, Radio Cadena Nacional, La Voz de Bolivia, Radio Fides, and Radio Sol.

The only difficulty for most North American viewers is that you'll need at least a 10-ft. dish with a circularly polarized C-band feed and a very clear view to the Southeastern horizon. Don't expect to see NSS806 beyond the Mississippi River. To try tuning it in, set your receiver to channel 23, Canal 7 Argentina. Programming will be in the PAL format. If you have a clear picture and good audio you will be able to receive the MPEGII channels. It's really worth a

MPEGII Receivers

Throughout the last couple of years I've reviewed many MPEGII FTA satellite receivers. In the future I'll do a round-up of FTA receivers and include a general discussion on the subject. Meanwhile, there are two excellent sources for current information on these receivers and other aspects of MPEGII reception. The first is *http:*/ /www.smallear.com which is well known to MT

readers. This is where you'll find information about analog reception in addition to MPEGII. They have a number of excellent links to other web sites of interest and they sell an extensive array of MPEGII as well as analog satellite reception equipment.

The other site is owned by Mike Kohl of Global Communications and can be found at http://www.global-cm.net. Mike sells MPEGII equipment as well as analog gear and also has many links to other sites of interest to satellite TV enthusiasts. Among the points of interest are his FTA MPEGII Signals North America chart. Of particular interest are the MPEGII tuning parameters for tuning in audio services on Nimiq 1 (91°W).

His home page featuring his world class dish farm is alone worth the visit. There are also some great pictures of how to do multiple feeds with one dish (strictly for the advanced TVRO hobbyist) and a number of text articles on topics of interest to the satellite TV hobbyist (particularly his views on a "Canadian solution").

Once you have an MPEGII receiver you can simply hook it up to your LNB and loop it through to your analog receiver. In this configuration the analog receiver controls the dish and you may point it to whichever satellite you wish to watch. Once the dish has arrived at the proper satellite, switch the output from your analog to the MPEGII and watch on your TV. It's really that simple.

You can also use an old Primestar dish with an MPEGII receiver for a stand-alone system turned to Telstar 5, for example. As cheap as MPEGII receivers are and since Primestar dishes, complete with feed horn and LNB, are being given away, there's no reason for you not to be starting your own "Adventures in the

Universal Video Descrambler



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Ask Bob

Getting Started

Bob Grove, W8JHD bgrove@grove-ent.com

A couple of oversights.

One of my colleagues pointed out two errors in my February column. Such corrections are always appreciated.

- (1) The shortwave broadcast jammers haven't been heard from the Communist Bloc in years; the bubbles and sweepers we hear now come, for the most part, from the Mideast and Cuba.
- (2) Not all voice comms heard in the 108-118 MHz range are necessarily VOR/transcribed weather broadcasts or out-of-band images of land mobile communications. Some air towers do respond below 118 MHz to aircraft transmitting in the 118-137 MHz band.

An excellent site that has audio samples and updates on jamming: http://america.his.com/jamming/

- Q. Is there anything better than the transistor to replace transistors in radios? (Robert E. Brock, Phoenix, AZ)
- **A.** While new technologies are always being explored, currently there seems to be nothing revolutionary looming on the horizon. The transistor has been shrunk to the point where millions of them can be put on a small integrated circuit (IC), so it would seem that size reduction of transistors will continue rather than a replacement technology for some time to come.
- Q. I had a 1961 Chevrolet Impala with a tube-type radio; at two locations on its tuning dial were little white circles with triangles. What did they indicate? (Mark Burns, Terre Haute, IN)
- **A.** They indicated the frequencies 640 and 1240 kHz of the old CONELRAD system, the old nationwide public alert system during the height of the cold war. The acronym stood for Control of Electronic Radiation.

In this system, all AM broadcast stations would go off the air except those formally appointed by the government. This was to prevent Soviet aircraft from beaming in on known radio station locations to direction-find their targets. The system was replaced by the Emergency Broadcasting System and was obsolete by the 1960s.

- Q. Is the receiver part of a transceiver better, equal to, or worse than a table top receiver? (Manikant, VU2JRO)
- **A.** Current transceivers use virtually the same receiver section as in their independent receivers; there is little difference in performance. The difference comes when a manufacturer continues to put out new receivers, but carries the same older model transceiver; then the newest receiver would be best. Similarly, if the manufacturer keeps an older receiver in the line, but continues to improve his transceiver line; the transceiver receiver section of the newest product would most likely be best, assuming the newest product is not a low-end radio.
- Q. What is independent sideband? (email inquiry)
- **A.** A conventional AM signal, such as that used by medium and shortwave broadcasters, has the same modulation information on both the upper and lower sidebands, which is a waste of spectrum. It is more spectrally efficient to use only upper or lower sideband (USB or LSB) than the entire AM bandwidth.

If a transmitter utilizes this technique, it is possible to send different information on the two sidebands simultaneously; this is independent sideband (ISB). Specialized receivers are made for commercial users which simultaneously detect the upper and lower sideband, feeding the extracted information into two separate channels. Conventional shortwave receivers, however, can only detect one sideband at a time, lower or upper.

Q. I have several receiving antennas on my property, but no transmitters. Nevertheless, my DirectTV satellite picture flickers up and down occasionally, but not when I'm watching DVDs, and it didn't jump when I had Prime Star. The service man doesn't know what causes it, but says it might be due to all my antennas. Is this likely? (James Johnson, Detroit, MI)

A. No, it's probably not even possible. The dish is very directional, and the offending antennas would have to be very close and virtually in line with the satellite beam to affect your reception.

The TV is losing vertical synchronization, causing it to go into a partial roll. This could be due to weak signal, poor synch on the signal, poorly adjusted AGC, or a defective TV set.

Did the service man adjust the dish for proper alignment, and was the signal grade (strength) good? Did he adjust the vertical hold or AGC on your TV?

Borrow another TV and see if it stops; that should tell you whether it's the set or the signal.

- Q. My portable shortwave seems to eat batteries, so I generally operate it from its AC adaptor. Can I leave the batteries in place while I'm using the adaptor without damaging the batteries? (Derick Ovenall, Wilmington, DE)
- **A.** Yes; battery-operated shortwave portables are not intended to use rechargeable batteries, so their internal power supplies are isolated from the battery compartment. If you switched to high-current-capacity NiCds, you would have to recharge them in an optional accessory charger.
- Q. Are there any anti-scanner laws in Canada affecting the monitoring of digitally-encrypted transmissions? (T.R., Greenburgh, NY)
- **A.** While there has been on-again, off-again discussion about restrictive scanner legislation in Canada, I am not aware that any has ever been effected into law.

Questions or tips sent to Ask Bob, c/o
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Bright Ideas

Getting Started

Gary Webbenhurst ab7ni@arrl.net

Well, I'm no April fool! Here are some bright ideas for getting better reception on your handheld radio. Did you lose the standard rubber duck antenna that came with your radio? Do you wish you had lost it? Here are some alternatives.

You can add a "counter poise" or ground plane for your handheld (or desktop radio.)
These are simple and cheap.
You can make several, a different one for each radio or any band

configuration you want – just understand the concept. Rubber ducks, and telescoping antennas, are usually half (or a quarter) of a dipole antenna. Although the design of the radio attempts to use the radio frame itself as the ground wave, it is a poor effort.

To determine the correct length, the formula is 468 divided by the operating frequency in MHz, with the answer in feet for a halfwave dipole. For example: 460.425 MHz divided into 468 is approximately one foot for a half dipole length. For a quarter wave, we need half of that, or about 6 inches. For an agency on VHF 155.595, the answer is about three feet, the quarter wave being about 1.5 feet, or 18 inches. Now you see the correlation between the antenna on top of the cop car and the frequency they use.

To make a counterpoise, you simply take a small wire (not shielded), cut it to length, and wrap it around the outside of the BNC antenna connection to your radio. If you wish, you can solder the wire to a battery connector RS# 64-3040. This can be slipped over the BNC. It is best if the wire can remain relatively straight, and not in contact with other metal. Do NOT strip the outside cover on the wire!

How do you find free copper wire? Stop by any commercial building project that is in the indoor phase. Find the electrician, and ask if you can have the *telephone wire scraps* from his trash dumpster. The guy I found said, "sure, take all you want." Let me tell you, it was all I could carry back to the car with two hands. I have a lifetime supply! All brand new copper wire with vinyl covering in a rainbow of different colors with lengths ranging from 18 inches to 8 feet. These are also useful for many other small projects. The best part is the cost – free!

25

Have you ever noticed how most rubber duck antennas of police handheld radios are tweaked beyond belief? The antenna is bent to distortion because the officers wear so much gear and the antenna does not have a chance. Happens to some of us, too. Now you know why everybody moved off lowband! The solution is to use two 90-degree BNC connectors. This keeps the antenna pointed down. (Also helpful if it rubs your love handles.)

For your scanner antenna, there are several options:

Telescoping antennas are a big improvement over the stock rubber duck. They work well on your desktop. However,

these antennas are awkward, if not dangerous, to deploy in public.



"Radio, scanner, siren, lights - action!"

If you carry your scanner about town, you can use a frequency specific antenna. I find that "rubber duck" antennas cut for a specific range are the best answer. If most of your local agencies are on VHF-HI, then look for a rubber duck cut to 155 MHz. If most of your local frequencies are UHF 460, then a duck cut for 462 MHz is the answer.

You can find rubber ducks cut for 27 MHz, 124,146, 151, 155, 168, 222, 430, 450, 462, 488, 504, 845, and 936 MHz. Try a new specialized rubber duck, you will notice a difference! Also remember that sometimes you need to move your HT just a few inches or tilted a particular way to find the "sweet spot" where reception is best.

So where do you find a frequency specific antenna? Rubber duck antennas are available from a variety of sources:

If you can't find one at your ham/ scanner dealer, watch for the next local hamswap. I have literally bought old rubber ducks by the hand full. You would also be amazed at what I find at garage sales.

There was an excellent article in the March 1998 issue of *QST* on making your own custom ducks.

I have a large assortment of rubber ducks including one for the aero 108-136 MHz range. That was the hardest to find. (Try Sporty's Pilot Shop at 1-800 543-8643 or http://www.sportys-catalog.com.) I simply purchased a \$20.00 replacement antenna (part# 8665A) for an aircraft transceiver. You can also try Icom America at 425-454-7619. Ask for a BNC replacement for their "A" series.

Obsessed with 800 MHz trunking? Cell phone antennas work great. There are mobile models as well as rubber ducks. You can use one from an old

"bag phone." It might need an adapter to fit your BNC. You can also salvage the battery, cigarette lighter plug, etc. from old cellular bag phone. If you don't have one in your closet, I bet your friends, relatives, or neighbors do. (Reader Dave Foster submitted this idea.)

I had promised some bright ideas for the *Police Call 2001* CD-ROM. Not enough space in the column this month, but I will tackle that one in the May issue.

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Richard Barnett ScanMaster@aol.com

The Future of Scanners and Consumer **Electronics**

ach year we report on the annual Consumer Electronics Show (CES) held in ■ January in the sprawling Las Vegas Convention Center. This year the show was busier than ever, with an estimated 110,000 attendees

With the economy in a downturn, why was it so busy at CES? A very interesting factoid was printed in one of the show's trade magazines: More new consumer electronics products will be developed in the next 5 years than have been produced since the beginning of the industry! This is startling and exciting information, but it is, at the same time, disconcerting. There are so many new players in consumer electronics, with so many new products, that to develop a hit new device will be extremely difficult in such a crowded marketplace.

For scanner manufacturers this is even more troubling. As consumers now play with their 500 channel TVs, DVD players, the Web, and an ever-increasing number of toys and tools, a relatively old pastime, communications monitoring, is going to be ever harder to sell. This brings us back to one of the first topics I covered in Monitoring Times: How does the industry grow the scanner business?

The manufacturers (Uniden, GRE, and the smaller players such as AOR, ICOM and the others), as well as the major national distributor (Radio Shack), at least have their core scanner customers: serious radio hobbyists, the news media, as well as public safety agencies. As long as the manufacturers continue to develop product that keeps up with the two way transmission technology - as they have done with trunking and as they hopefully will do with digital - these core customers will continue to buy the product.

But will it be possible for Uniden and Radio Shack to increase interest in the hobby, or even maintain it, among novices and other potential customers? As they continue to serve their base, will they, out of necessity, complicate the radios to the point where they are no longer accessible to the first timer? It's a real Catch-22. Clearly, though, if the manufacturers don't keep up with the various transmission schemes, most first-timers will find nothing to hear. It's critical that features such as PC-interfaces and SmartScanner downloads – techniques to make the programming of scanners easier – be promoted and improved upon whenever possible.

I've said it before and, in my second to last article for MT, I'll repeat it again: We must applaud and continue to support the manufacturers and retailers who have done so much for our hobby, particularly in the last five years. New products from Uniden, GRE, and others have really helped the entire monitoring community, from scanner buffs to the news media, and on to state, local, and federal officials who use scanners in their work.

Now it's our turn to help them grow the business. If you have ideas on how to get more people interested in scanning, let me know by sending e-mail to scanmaster@aol.com or writing me care of Monitoring Times. In the meantime, everyone can help out by getting the word out to family, friends and colleagues, and particularly youngsters, about the merits, and the fun, of the hobby.

Air Radio News & Notes

Recently an avionics engineer with Honeywell told me that ACARS, the data transmission system for airliners, was going to switch to a digitally encrypted system within a few years. One of the reasons for this apparently is that information on the English Royal Family was sent via ACARS in the clear, and was somehow misused. There are ACARS decoders and software currently available which we hope will not one day become fodder for the trash heap....

Speaking of airliner radio, during the first week of January a report by Robert Hager of NBC Nightly News described how the nation's air traffic control system was in desperate need of additional AM radio channels. The report spoke of how the system currently uses channels spaced at 25 kHz intervals and that there were proposals on the table for both 12.5 kHz channels and/or a switch to digital transmissions, all of which would require new equipment costing billions. In Europe 8.33 kHz spacing is used, so none of this would seem too far-fetched. In the meantime, new routes that passenger airlines wish to fly are put on hold due to a lack of available frequencies.....

Speaking of Europe, why is it that aircraft monitoring took off (excuse the pun) across the Atlantic while it never really caught on here in the U.S.? What is the great appeal of aircraft monitoring anyway?.....

Do any of the airlines still offer one of the headphone channels as a patch to the air traffic control frequencies?....

Fun monitoring challenge: Take a scanner and any other inconspicuous monitoring tools you might have to the airport (you can sit in the parking lot rather than going inside a terminal where security issues may cause airport police concern). Take an hour and see how many different frequencies you can identify in use at the airport, from the AM VHF and UHF air frequencies, to the airport police, fire and maintenance departments, ground crews, data bursts from weather monitoring stations, rental car companies, hotel buses, limo services, taxis, and so much more. Take it a step further and try to nab the subaudible tones for the stations, then try to find all the frequencies used in trunked system at the airport, as well as talkgroups. Pretty soon you'll find you've killed an afternoon!

Mississippi Monitoring

In a recent article (Nov 2000) we commented that Mississippi was the one state from which we never seemed to receive frequency contributions. John Mayson was quick to respond to our assertion with the following e-mail:

'I presume you're trying to rekindle the Civil War by comparing the Magnolia State to the Bay State? :-) ("I'm from Georgia and my wife from New Hampshire, so I'm allowed to poke fun at New England.)

"You're right. Mississippi scanner information is hard to come by. I find myself on I-10 and I-20 in Mississippi enough that I've collected some information about radio systems there."

FORREST COUNTY

Hattiesburg TRS

Motorola Type II Analog

856.2375, 857.2375, 858.2375, 859.2375, 859.7625, 859.8875, 860.2375,

860.7625 MHz

Forrest County Sheriff's Office

3248 Law Channel

Forrest County VFD

1360 Dispatch

1424 Operations

1008 AAA Ambulance

Hattiesburg Police

176 1A

Dispatch NCIC

336 10 Emergency

144 1D Car-to-Car

240 1F Supervisors

304 1H STAR 400 11 NET 48A TG All Talk Group 800 Law Common channel

Hattiesburg Fire 1264 1A Dispatch 1328 1B Operations

Petal Fire 4912 Dispatch

University of Southern Mississippi 6412 Police Dispatch

HINDS COUNTY

Jackson TRS covered in November column

Mississippi Highway Patrol District 1 KKA929 42.12 Jackson

42.02 Statewide Intersystem

Mississippi State Tax Commission 154.665

LAMAR COUNTY

Lamar County TRS

Motorola Type II Analog 856.4875, 857.4875, 858.4875, 859.4875, 860.4875 MHz

Lamar County Sheriff's Office

Primary

Lamar County VFD 320 Dispatch Tac 1 352 Tac 2

Lamar County EMS 368 Dispatch 176

Purvis Police 1120 Dispatch

LAUDERDALE COUNTY

Mississippi Highway Patrol District 6

KKB238 42.08 Meridian 42.02 Statewide Intersystem

LEE COUNTY

Lee County TRS

Motorola Type II Analog

Tupelo: 856.2625, 857.2625, 858.2625, 859.2625, 860.2625 MHz Saltillo: 856.9875, 857.9875, 858.9875, 859.9875, 860.9875 MHz

Lee County Sheriff's Office

528 Dispatch

Lee County EMS

624 Dispatch 688 HEAR (155.340 MHz link)

Beldon Police 1040 Dispatch **Richmond Police** 1392 Dispatch Saltillo Police 1232 Dispatch **Tupelo Police** 144 Dispatch 176 Car-to-Car Tupelo Fire 432 Dispatch Verona Police 816 Dispatch

RANKIN COUNTY

Rankin County TRS

Motorola Type II Analog

Rankin County Sheriff's Office

Dispatch 336 Car-to-Car

Countywide Law Enforcement

Florence Police 1232 Dispatch

Flowood Police 1552 Dispatch 1584 Car-to-Car 2032 Car-to-Car

Pearl Police 880 Dispatch Car-to-Car

1712 Car-to-Car Pelahatchie Police

1168 Dispatch **Puckett Fire** 2960 Dispatch

Richland Police 1744 Dispatch

Richland Fire

1904 Dispatch

Ross Barnett Reservoir Patrol

2256 Dispatch

State Mental Hospital

Mississippi Highway Patrol District 1

42.02 Statewide Intersystem

Trunking Updates

Wayne Batten was kind enough to send in the following report:

CLARK COUNTY WASHINGTON

STATE

Known Frequencies (Motorola Type II) 855.9875 856.7625

856.9625 856 9375 856.9875 857.7625

048048 VANCOUVER ECC 857.9375 857.9625 048080 VANCOUVER ECC 857.9875 048112 VANCOUVER ECC 858.7625 048144 VANCOUVER ECC 048176 858.9375 VANCOUVER ECC 048208 VANCOUVER ECC 858.9625 858.9875 048240 VANCOUVER ECC 048272 859 7625 CCSO A 859.9375 048304 CCSO B 859.9625 048336 CCSO C 048560 ANIMAL CONTROL 859.9875 860.7625 047696 STATE CONTROL 1 047728 STATE CONTROL 2 860.9375 860.9625 047760 STATE CONTROL 3 860.9875 047792 STATE CONTROL 4 047824 STATE RECORDS 866.1625 047856 866.4125 STATE TAC 1 866.9625 047888 STATE CONTROL 7 867.2375 047920 STATE CONTROL 9 867.4875 047952 STATE OPS 3 Known IDs in use (Other than CTRAN)

POLICE (LAW) 040112 040144 VPD/VFD CODE ENFORCEMENT 040176 UNKNOWN 040204

040240 RESERVED VPD 040272 RESERVED VPD 040304 RESERVED VPD 040912 COWLITZ COUNTY 040944 SKAMANIA COUNTY

041008 VPD PATROL 041040 VPD PATROL CLARK COUNTY SO COMMON 041072 041104 SHERIFF CUSTODY 1 041136 SHERIFF CUSTODY 2

041168 SHERIFF CUSTODY 3 041200 SHERIFF CUSTODY 4 041232 SHERIFF CUSTODY 5 041264 SHERIFF CUSTODY 6

041296 WORK CREW 041328 COLLINTY 041360 CLARK COUNTY SHERIFF TRNG 041456 BATTLEGROUND PD

041520 REBEL 1 041616 CAMAS PD WASHOUGAL PD 041680 041776 RIDGEFIELD PD 041840 REBEL 2 042000 REBEL 3

044656 CONTROL 1 044688 CONTROL 2 044720 CONTROL 3 044752 CONTROL 4 044784 CONTROL 5

044816 TAC 1 044848 TAC 2 044880 TAC 3

044912 TAC 4 044944 TAC 5 (ALSO USED FOR TRNG) TAC 6

044976 EAGLE 1 045008 EAGLE 2 045040 EAGLE 3 045072 EAGLE 4

045104 EAGLE 5 045136 IFRN 045168 UNKNOWN 045200 RECORDS

CCSO DET 045296 045328 CCSO TRNG 045360 CCSO DET 045392 CCSO (SERT)

045424 WSP MONITOR MULTI-SELECT (DISPATCHER SIMUL-046487 CAST)

046928 VANĆOUVER WATER DEPT. 048016 VANCOUVER ECC

FIRE/EMERGENCY M\II

CONTROL 9 VFD 043216 043248 CONTROL 7 CC FIRE DISPATCH 043280 CLARK COUNTY FIRE OPS 2 043312 CLARK COUNTY FIRE OPS 3 043344 CONTROL 8 CC FIRE 043408 CLARK COUNTY FIRE OPS 4 043440 **CLARK COUNTY FIRE OPS 5** 043472 CLARK COUNTY FIRE OPS 6 043504 CLARK COUNTY FIRE OPS 7 043536 CLARK COUNTY FIRE OPS 8 043568 CLARK COUNTY FIRE OPS 9 043600 CLARK COUNTY FIRE OPS 10 043632 CLARK COUNTY FIRE OPS 11 043664 CLARK COUNTY FIRE OPS COMMAND

043696 CLARK COUNTY FIRE OPS COMMAND 13

043728 CLARK COUNTY FIRE OPS COMMAND 043760 CLARK COUNTY FIRE MARSHALLS

CLARK COUNTY FIRE MARSHALLS 043792 LIFE FLIGHT

043856 043888 FT JAMES PAPERMILL FJ-1 043920 FT JAMES PAPERMILL FJ-2 043952 FT JAMES PAPERMILL

043984 CLARK COUNTY FIRE (TRNG) 044016 CLARK COUNTY FIRE PREVENTION 044048 CLARK COUNTY FIRE LOG LOGISTICS 044080 CLARK COUNTY FIRE PLAN.

044112 HA7MAT 044336 CC EMS SWMC 044496 CC EMS DISPATCH 044528 CC EMS

043376 **CLARK COUNTY FIRE** 043824 WDOT 044144 **CLARK COUNTY FIRE?**

044176 VANCOUVER OPS 044592 UNKNOWN 045168 UNKNOWN RADIO SHOP\TESTING 16

002698 **EMERGENCY DES** 030916 **EMERGENCY PATCH**

LEGEND:

CLARK COUMTY SHERIFF OFFICE ((S0 =ECC =EMERGENCY COMMAND CENTER WDOT =WASHINGTON DEPARTMENT OF TRANS-**PORTATION**

LAW ENFORCMENT RADIO NETWORK

LERN = VPD =VANCOUVER POLICE DEPARTMENT VFD =VANCOUVER FIRE DEPARTMENT SWMC =SOUTHWEST WASHINGTON MEDICAL

CENTER $\mathbb{C} =$ CLARK COUNTY

MONITORING TIMES



Larry Van Horn larry@grove-ent.com

U.S. NOAA Weather Radio Stations and Frequencies

Courtesy of the National Weather Service

Continued from the March 2001 issue of Monitoring Times magazine. Information courtesy of the

		HAWAII		
Hawaii (Kulani Cone)	WWG76	162.550	1000	Honolulu
Hawaii (South Point) Kaneohe	WWG27	162.550	150	Honolulu
Kaneone Kauai (Kokee)	WWH21 WWG74	162.400 162.400	1000 1000	Honolulu Honolulu
Maui (Mt. Haleakala)	WWG75	162.400	1000	Honolulu
Oahu (Mt. Kaala)	KBA99	162.550	1000	Honolulu/Oahu Kai
(Hawaii Kai)	WWF39	162.400	10	Honolulu
		IOWA		
Burlington	WXN83	162.525	300	Quad Cities
Cedar Rapids	WXL61	162.475	1000	Quad Cities
Des Moines	WXL57	162.550	1000	Des Moines
Dubuque Dubuque	WXL64	162.400	1000	Quad Cities
Fairfield	WXN85	162.400	300	Quad Cities
Fort Dodge	WXK84	162.400	300	Des Moines
Sioux City	WXL62	162.475	1000	Sioux Falls (SD)
Waterloo	WXL94	162.550	1000	Des Moines
		IDAHO		
Boise	WXK68	162.550	100	Boise
Bonners Ferry	WWG99	162.500	100	Spokane
Grangeville [']	KXI82	162.450	25	Missoula
Lewiston	WXK98	162.550	100	Spokane
McCall	WWF58	162.475	100	Boise
Payette	WXK88	162.400	100	Boise
Pocatello	WXL33	162.550	100	Pocatello
win Falls	WXL35	162.400	100	Boise
		ILLINOI	\$	
Champaign	WXJ76	162.550	1000	Central
Chicago	KW039	162.550	500	Chicago
Jacksonville	WXM90	162.525	300	Central
Marion	WXM49	162.425	1000	Paducah
Macomb	WXJ92	162.500	1000	Quad Cities
Newton	KXI48	162.450	1000	Central
Odell	WXK24	162.450	1000	Chicago
Paris Dania	KX147	162.525	300	Central
Peoria Princeton	WXJ71	162.475	1000	Central Ouad Cities
Princeton Rock Island/Moline	WXL22 WXJ73	162.425 162.550	300 1000	Quad Cities Quad Cities
Rockford	WXJ73 WXJ74	162.550	1000	Chicago
Springfield	WXJ75	162.400	1000	Central
		INDIAN	A	
Bloomington	WXM78	162.450	1000	Indianapolis
Edwardsport	WWG83	162.425	1000	Indianapolis
Evansville	KIG76	162.550	1000	Paducah
Fort Wavne	WXJ58	162.550	1000	Northern
Georgia	WWG72	162.500	1000	Indianapolis
Indianapolis	KEC74	162.550	1000	Indianapolis
Lafayette (Yeoman)	WXK74	162.475	1000	Indianapolis .
Marion	WXM98	162.450	400	Northern
North Webster	WWG45	162.425	300	Northern
Putnamville	WXK72	162.400	1000	Indianapolis
Seymour	WWG73	162.525	1000	Indianapolis
South Bend	WXJ57	162.400	1000	Northern

		KANASA	S	
Al II	M// 71	1/0 505	1000	T. I
Abilene Beaumont	WXL71 WWH22	162.525 162.500	1000 300	Topeka Wichita
Chanute	WXK95	162.400	1000	Wichita
Colby/Goodland	WXK96	162.400	600	Goodland
Concordia	WXK94	162.550	1000	Topeka
Dodge City	WXK93	162.475	1000	Dodge City
Ellsworth	WXK92	162.400	1000	Wichita
Lenora	WWF87	162.425	100	Goodland
Topeka	WXK91	162.475	1000	Topeka
Tribune Wichita	WWG22 KEC59	162.550 162.550	150 1000	Dodge City Wichita
	112.007	102.550		
	K	KENTUCI	(Y	
Ashland	KIH39	162.550	1000	Charleston
Beattyville	WWG67	162.500	100	Jackson
Bowling Green	KIH45	162.400	1000	Louisville
Covington	KIH42	162.550	1000	Cincinnati
Elizabethtown	KIH43A	162.550	100	Louisville
Frenchburg	WWG63	162.475	100	Jackson
Harlan	WWG68	162.450	100	Jackson
Hazard	KIH40	162.475	1000	Jackson
Hopkinsville	KXI26	162.450	300	Paducah
Jackson Lackson	WWG26	162.425	100	Jackson
Lexington London	KIH41 WWG65	162.400 162.475	1000 100	Louisville Jackson
Louisville	KIH43	162.475	1000	Louisville
McKee	WWG64	162.425	1000	Jackson
Madisonville	WXJ91	162.525	1000	Paducah
Manchester	WWG66	162.400	100	Jackson
Mavfield	KIH46	162.475	1000	Paducah
Monticello	WWG80	162.425	100	Jackson
Morehead	WWG71	162.425	100	Jackson
Mount Vernon	WWG70	162.425	100	Jackson
Paintsville	WWG28	162.525	100	Jackson
Phelps	WWG81	162.500	100	Jackson
Pikeville	WWG69	162.400	300	Jackson
Pineville	WWG62	162.525	100	Jackson
Richmond	WWF82	162.525	100	Louisville
Somerset	KIH44	162.550	1000	Jackson
Stanton	WWG61	162.550	100	Jackson
West Liberty	WWG79	162.450	100	Jackson
Williamsburg	WWG78	162.500	100	Jackson
	L	OUISIAN	IA	
Alexandria	WXK78	162.475	1000	Lake Charles
Baton Rouge	KHB46	162.400	700	New Orleans/Baton Rouge
Buras	WXL41	162.475	1000	New Orleans/Baton Rouge
Lafayette	WXK80	162.550	1000	Lake Charles
Lake Charles	KHB42	162.400	500	Lake Charles
Monroe	WXJ96	162.550	1000	Shreveport
Morgan City	KIH23	162.475	1000	New Orleans/Baton Rouge
New Orleans Shreveport	KHB43 WXJ97	162.550 162.400	1000 1000	New Orleans/Baton Rouge Shreveport
	11/1//	102.400	1000	aure se hou
		MAINE		
Caribou	WXM77	162.525	500	Caribou
Dresden	WXM60	162.475	100	Portland
Ellsworth	KEC93	162.400	1000	Portland
Falmouth	KD095	162.550	500	Portland

	N	IARYLAI	VD	
Baltimore	KEC83	162.400	1000	Baltimore/Washington
Hagerstown	WXM42	162.475	1000	Baltimore/Washington
Salisbury	KEC92	162.475	1000	Wakefield
	MAS	SACHUS	SETTS	
Boston	KHB35	162.475	500	Boston/Hyannis
(Camp Edwards)	KEC73	162.550	1000	Boston
Mt. Greylock	WWF48	162.525	100	Albany
Worcester	WXL93	162.550	500	Boston
	J	VICHIGA	N.	
Alpena	KIG83	162.550	500	North Central Lower
Detroit	KEC63	162.550	330	Detroit
Flint	KIH29	162.475	1000	Detroit
Gaylord	WWF70	162.500	100	North Central Lower
Grand Rapids	KIG63	162.550	1000	Grand Rapids
Hesperia Houghton	WWF36 WXK73	162.475 162.400	150 1000	Grand Rapids Marquette
Marquette	KIG66	162.400	300	Marquette
Marquerie Onondaaa	WXK81	162.400	500	Grand Rapids
Oshtemo	WWF34	162.475	500	Grand Rapids
Sault Ste Marie	KIG74	162.550	1000	North Central Lower
Traverse City	KIH22	162.400	330	North Central Lower
	M	IINNESC	TA	
Bemidji	WXM99	162.425	110	Eastern
Bogus Lake	KXI43	162.400	300	Duluth
Detroit Lakes	WXM64	162.400	100	Eastern
Duluth	KIG64	162.550	1000	Duluth
Ely	KXI44	162.500	300	Duluth
International Falls	WXK45	162.550	1000	Duluth
Mankato	WXK40	162.400	1000	Minneapolis
Minneapolis/St. Paul	KEC65	162.550	1000	Minneapolis
Park Rapids	WWG98	162.475 162.475	300	Eastern
Rochester Roosevelt	WXK41 WWF45	162.475	1000 190	La Crosse Eastern
St. Cloud	WXL65	162.400	330	Minneapolis
Thief River Falls	WXK43	162.550	1000	Eastern
Willmar	WXK44	162.475	1000	Minneapolis
	ı	VIISSOU	RI	
Alton	KXI35	162.500	300	Springfield
Bourbon	WWF75	162.525	1000	St. Louis
Camdenton	WXJ90	162.550	1000	Springfield
Columbia	WXL45	162.400	1000	St. Louis
Doniphan	WWG48	162.450	1000	Paducah
Fredricktown	WWG49	162.500	1000	St. Louis
Hannibal	WXK82	162.475	1000	St. Louis
Hermitage	WXM81	162.450	100	Springfield
Joplin Kahoka	WXJ61	162.425	1000 300	Springfield Quad Cities
kanoka Kansas City	WXL99 KID77	162.450 162.550	1000	Kansas City/Pleasant H
La Plata	WXM39	162.525	300	Kansas City/Pleasant H
Lancaster	WXM36	162.550	300	Kansas City/Pleasant H
Sikeston	WXL47	162.400	1000	Paducah
Springfield	WXL46	162.400	1000	Springfield
St Insenh	KFC77	162.400	1000	Kansas City/Pleasant H

KEC77

KD089

WWF76

WWG47

St. Joseph

Summersville

St. Louis

Wardell

West Plains

Springfield

Memphis

Springfield

. Kansas City/Pleasant Hill

1000 St. Louis

1000

1000

162,400

162.550

162.475

162.525

162.525

Did your Antenna System Survive the Harsh Weather? Do Your Signals Seem a Little Weak?

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Grove OMNI II

Designed by Bob Grove, this exclusive Grove product offers 25-1300 MHz coverage; lightweight, compact design, high performance, and low cost! Designed especially for wide-area metropolitan listeners, the 68" Omni can be mounted on a mast, in an attic crawl space, against a wall—just about anywhere convenient.

BONUS FEATURE! Although the Omni is essentially non-directional, a metal mast gives it useful directional properties. Overload interference from paging transmitters, weather stations, FM or TV broadcasters, or other sources may be reduced or eliminated when positioning the antenna on the mast at the time of installation! Similarly, a distant, weak signal may be peaked by the same technique!

Balun transformer with F connector, offset pipe, mounting hardware and full instructions included.

Order ANT 5

\$29.95

includes shipping in the US

SCANNER BEAM

Our world-renowned Scanner Beam has been improved to provide unexcelled 30-50 MHz low band reception, 108-137 MHz aircraft, 137-174 MHz high band, 225-400 MHz military aircraft and satellites, 406-512 MHz UHF, and 806-960 MHz microwave mobile.

HAMS NOTE—can be used for transmitting up to 50 watts on 144, 220, and 420 MHz bands. 50/75 ohms nominal impedance.

May be used with inexpensive TV antenna rotator or fixed in favored direction. Local signals still come in loud and clear from all directions.

Balun transformer, offset pipe and all mounting hardware included (requires TV type F connector on your coax). Approximate size 8'H x 5'W

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\$74.95

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THE SCANTENNA

This omnidirectional scanner antenna will equal or outperform any competitor on the market. Its dipole-cluster design utilizes broadband techniques to provide continuous frequency coverage from 25-1300 MHz, offering superb reception of public safety, civilian and military aircraft, hams, personal communication devices, maritime, CB—anything in its frequency range!

Approximate size 7-1/2'H x 4-1/2'W.

SPECIAL: Now

includes 50' of coax cable plus Motorola and BNC connectors! ORDER ANT 07

\$54.95

includes shipping in the US



Professional Wideband Discone

The discone antenna is used by government and military agencies worldwide because of its wide bandwidth characteristics and nondirectional coverage. Now Diamond offers a professional grade discone at a popular price.

Designed for use with wide-frequency coverage VHF/UHF scanners and receivers, the Diamond D130J discone consists of 16 rugged, stainless steel elements and is capable of transmitting up to 200 watts in the amateur 50, 144, 220, 432, 900, and 1200 MHz bands.

As a receiving antenna, the D130J is omnidirectional for continuous 25-1000 MHz (and above) coverage. A base-loaded, vertical top element is used as a low band (30-50 MHz) frequency extender. *Orde*

The elements are arranged on a 24-inch support pipe equipped with two strong mounting brackets to accomodate any standard mast-pipe (1"to 2-1/8" diameter).



Order ANT 9

\$99.95

includes shipping in the US

GR VE

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web: www.grove-ent.com



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Hugh's Favorite Frequencies

letter writer asked to see some of my own picks for best utility frequencies. This does seem like a good idea. Here, then, are some personal favorites.

US Air Force

As compared to Europe and the northeastern United States, California is not exactly Radio Action Central. Around here, the USAF Global High Frequency System is probably the best listening on high frequency ("short wave"). We covered the Global pretty thoroughly last month, so let's just review the frequencies. They are 4724, 6712, 6739, 8992, 9025, 11175, 11181, 13200, 13212, 15016, and 20390 kilohertz, all upper-sideband voice (USB).

An interesting net, which is considered a GHFS backup, is the Air Force's Eastern Test Range activity, primarily Cape Radio at Cape Canaveral, FL, on 10780 USB. This is also a good channel to monitor any time there is a launch countdown on this range, especially a space shuttle launch. Downrange operations are heard on many other frequencies. Recent USB hits include 3041, 3365, 4521.5, 5190, 5717, 6937, 7461, 7676, 7833, 9043, 13237, 15021, and 20390.

Coast Guard

The US Coast Guard probably has a hundred worthwhile frequencies all by itself. Most interesting is the Safety Of Flight (SOF) network, where aircraft pass positions and operation status at set intervals. In searches and rescues, this becomes a catch-all net for participating units on surface, shore, and air.

USCG SOF frequencies are 3053, 3056, 4730, 4733, 4739, 5694, 5696, 5699, 8980, 8983, 13218, 13221, 15082, 15085, 15088, 17988, and 17991 kHz USB. 4733, 5696, 8993, and 15088 are primary, and by far the busiest. Some of the others will be dead for months at a time, coming suddenly alive in major incidents.

The US Coast Guard – which after all started out looking for smugglers as the Revenue Cutter Service – still plays a major part in border interdiction, including the well-pub-

licized "war on drugs." The Greater Antilles Section (GANTSEC) is active on 3396, 5399 and 6815.6 kHz USB. Callups tend to be in the clear but most traffic is scrambled. The odd "whale songs" that follow these nets around are almost certainly due to some unknown device seeking lock, plus a lot of overcompressed circuit noise.

2182, an old calling and distress frequency, still has some good activity in the US and Canada. The Canadian Coast Guard also runs a lot of phone patches on 6964 USB to its Rescue Coordination Center in Halifax. 4125 kHz, a calling frequency which used to be popular with fishing fleets, is still monitored and used for weather broadcasts by Canada and several other countries.

Other "War On Drugs"

The US Navy uses its remaining HF mostly for tactical data link coordination and anti-submarine warfare. Both capabilities, of course, are also relevant to joint drug activities. A good frequency is 8971 kHz, the Blue Star net out of Puerto Rico. Other nets for exercises or occasionally the real thing come up on unpredictable frequencies above and below the 6 MHz maritime band.

The Royal Dutch Navy, out of Curacao in the Caribbean, uses 11178 USB. Various American and international task force units come up there, too, making something of a language soup at times.

The US Drug Enforcement Agency's "Atlas" communication center in Iowa is often heard working "Flint" aircraft on 5277, 5841, 7657, 9497, 11076, 14686, and 19131 USB. US Customs continues to maintain its old COTHEN (Customs Over-The-Horizon Enforcement Network), using one of the first HF autoscan systems. Stations exchange data bursts and occasional USB voice on 5732, 7527, 8912, 10242, 11494, 13907, 15867, 18594, 20890, 23214, 25350, and perhaps a couple of others. This net is not as active as it once was.

Fax and Teleprinting

I'm a huge fan of weather faxes. When signals are strong and not smeared up by

multipath, buzzy old HF can produce astonishingly clear results.

Pacific weather pictures and charts are sent out by the Coast guard from Point Reyes, California, on 4346, 8682, 12730, 17151.2, and 22527 kHz. Settings for nearly all weather faxes are 120/576. Tune them in USB and 1.9 kHz lower.

New Orleans transmits information for the Gulf on 4316, 8504 2790, and 17148. Boston has Atlantic products on 6340.5, 9110, and 12750. Finally, Honolulu has very interesting Central and West Pacific charts on 9982.5, 11090, 16135, and 23331.5, when I can receive them.

Japan has two stations, both out of Tokyo. JMJ is on 3365, 5405, 9438, 14692.5, and 18441.2. JMH uses 3622.5, 7305 (when broadcast splatter permits), 9970 (same problem), 13597, 18220, and 23522.9.

Kyodo News, which sends mostly scrambled newspapers from Japan and Singapore, also has some very odd fishing charts and general strangeness on 4316, 8467.5, 12745.5, 16035, 16971, 17069.5, 17430, and 22542, some at the lower speed of 60/576.

The Canadian Forces weather center in Halifax transmits similar faxes on 4271, 6496.4, 10536, and 13510. These are sent on the hour, and then the rest of the time is filled in by weather observations in radio teletype (RTTY), with an odd shift of 550 Hertz and a 75-baud speed.

RTTY itself is a good technical challenge, since most is uncopyable. There are a couple of "RTTY broadcasting stations" on the air now. Best is WA9XHN on 6994 and 13972, 850/75. Several RTTY amateur nets serve the military on such frequencies as 4000 and 7915, both 850/75.

Lately I've been shooting a lot of Pactor-I, an interesting HF mode combining computer networking with proven maritime teleprinting techniques. Try 6959.5, 7576, 7970, 10338.5, 14506.5, 15971, 18190.5, all of which are mail systems with hours of traffic lists at 200/100.

This ought to keep everyone listening for a month. Have fun with these.





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ABBREVIATIONS USED IN THIS COLUMN

AFB Air Force Base

ALE **Automatic Link Establishment** AM **Amplitude Modulation**

AMVER Automated Mutual-assistance Vessel Rescue ARQ Automatic Repeat Request teleprinting system **AWACS** Airborne Warning And Control System CAMSLANT Communication Area Master Station, Atlantic

CIA **US Central Intelligence Agency** CW Continuous Wave (Morse telegraphy)

DEA **Drug Enforcement Agency**

DX Distant Transmitter

UK English female "numbers" with folk tune E3 CIA English female "numbers," counts 1-0 E5

EAM **Emergency Action Message**

FACSFAC Fleet Area Control and Surveillance Facility

Radiofacsimile FAX

FEC Forward Error Correction teleprinting system **GMDSS** Global Marine Distress and Safety System

HQ Headquarters

M22 Israeli intelligence or military, callsign 4XZ Cuban CW "numbers, " ANDUWRIGMT for 1-0 M8 M8a Specific version of above with 3 messages

MARS Military Affiliate Radio System

MFA Ministry of Foreign Affairs

M/v Motor vessel NAS **Naval Air Station**

NHQARC National Headquarters, American Red Cross

Pactor Packet Teleprinting Over Radio

PR Puerto Rico

RSA Republic of South Africa RTTY Radioteletype Special Air Mission

SAM **SHARES Shared Resources**

Simplex Telex Over Radio, FEC mode Sitor-B

UK United Kingdom Unid Unidentified US **United States**

V13 New Star, Taiwanese Chinese language numbers V2 Cuban "numbers" starting with "Atencion!" V2a Specific version of above with 3 messages

Flight Weather broadcasts VOLMET

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in brackets with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association (see MT 3/01).

- 60.0 Unid-Probably WWVB, CO, standard time station with continuous carrier lowered once per second, closely matching standard WWV ticks on another band, at 0052. (Hugh Stegman-CA)
- 338.0 POB-Nondirectional beacon at Pope AFB, NC, in AM at 0555. (Duke Rumley-NC)
- 2390.0 PCKH-Motor Vessel Alert, calling m/v Triton, at 0122. PDQE-m/v Diamant, calling m/v Balticborg, at 0124. (Ary Boender-Netherlands)
- 2486.0 OST-Oostende Radio, Belgium, working unid vessel with engine
- problems, at 2252. (Boender-Netherlands) VBA- Canadian Coast Guard, Thunder Bay, with Marine Infor-2582.0 mation Bulletins at 0039. (Ron Perron-MD)
- 2687.0 JWT-Norwegian navy, Stavanger, in radio checks with "C-7-5" and "W-1-W," at 2344. (Boender-Netherlands)
- 2749.0 VCO-Canadian Coast Guard, Sydney, NS, with info bulletins at 0041. (Perron-MD)
- P-Russian navy single-letter CW "cluster" marker, Kaliningrad, 3594.8 at 2357. (Boender-Netherlands)

- 3594.9 S-Russian navy single-letter CW "cluster" marker, Arkhangelsk, at 2357. (Boender-Netherlands)
- 3595.0 C-Russian navy single-letter CW "cluster" marker, Moscow, at 2357. (Boender-Netherlands)
- Cuban CW "cut" numbers (M8), in progress, at 0202. Cuban 4026.0 "Atencion" AM numbers (V2), different day at 0303. (Camillo Castillo-Panama)
- CFH-Canadian Forces, Halifax, NS, with weather codes at 0242. 4271.0 (Tom Sevart-KS)
- 4372.0 "D-3-Y"-US Navy, calling Giant Killer (FACSFAC, VA), no joy, and working six other stations in some kind of exercise, followed by "5-B-Q" with a real-world medical emergency, at 0050. (Perron-MD)
- 4570.5 HZN46-Jeddah Meteorological, Saudi Arabia, with weather in RTTY (500/100) at 0336. (Bob Hall-RSA)
- 1Kzsdkaca-Polish United Nations troops in Kosovo, calling 4700.0 1Kzdjankovic in ALE, also on 7599, at 2035. (Day Watson-UK)
- Rescue 51-Royal Air Force Nimrod, working Kinloss Rescue at 0740. Kinloss calling Rescue 193, at 0744. (Middle Atlantic DXer-MD)
- 4724.0 Andrews-US Air Force, Andrews AFB, MD, with EAM at 0635. (Sevart-KS)
- 5105.0 BVM-Probable UK military, sounding in ALE at 1535. BVA, sounding at 1539. FCD, sounding at 1557. BLE, sounding at 1627. DKL, sounding at 1732. (Watson-UK)
- Cuban CW "cut" numbers (M8a), two Saturdays at 0200, two 5418.0 Thursdays at 0300. Cuban "Atencion AM numbers (V2), Friday at 0200, Saturday at 0300. (Castillo-Panama)
- 5786.0 Batz-French Ile de Batz, with ALE call to Houat, Ile de Houat, in a network also including Glenan and Galva, and also on 7512 and 8165 kHz, at 0845. (Watson-UK) Molene, Ile de Molene, calling Groix, Ile de Groix, at 1043. Molene calling Batz at 1052. (MADX-MD)
- 5810.0 US CIA "Counting" numbers station (E5), English female voice, two Saturdays at 0200, three Wednesdays at 0300. (Castillo-
- 5860.0 FAADCA-Federal Aviation Administration, Washington, DC, calling FAAASO, College Park, MD, in ALE, at 0035. T42N-FAA, working T12N in ALE, at 2259. FAANY, New York, sounding at 2314. FAAZID, Indianapolis, sounding at 2314. FAAZBW, Boston, sounding at 2317. DEFAULT, presumably an FAA station which forgot to set its address, sounding at 2318. (Watson-UK)
- 6378.5 4XZ-Israeli intelligence (M22), with marker at 0041 and 0051. (Dom Mallozzi-MA)
- 6415.5 7TF-Boufarik Radio, Algeria, with traffic list at 0228. (Mallozzi-
- 6481.6 CLA-Havana Radio, Cuba, with traffic list at 0101. (Mallozzi-MA)
- 6513.0 Unid-coast station working Russian motor vessels, including m/ v's Olympiad, Kapitan, and Metrochkin, in Russian, at 0621. (MADX-MD) [This frequency gets really busy in winter. –Hugh]
- 6712.0 Cotam 1024-French Air Force transport leaving Guyana with 136 passengers, working Circus Vert (Headquarters, Villacoublay), at 0512. Croughton-US Air Force Global High-Frequency System, with two EAMs at 2338. (Perron-MD) [Despite Croughton's well-publicized stand-down, the call is still heard. -Hugh]
- Cuban CW "cut" numbers (M8a), two Thursdays at 1300. 6768.0 (Castillo-Panama)
- Cuban CW "cut" numbers (M8a), daily at 1200, and nearly every day at 1300. (Castillo-Panama) 6796.0
- 6845.0 HSP-Probable UK military, sounding in ALE at 0314. (MADX-MD) Cuban "Atencion" station (V2a), with 3 messages in AM to 00642, 95612, and 01022, at 0300, ending at 0343 with 3 "Final." 6855.0

(Gary Cohen, MA)

- 6933.0 Cuban CW "cut" numbers (M8a), Thursday and Saturday at 1200, and Tuesday and Saturday at 1300. (Castillo-Panama)
- 7535.0 Ramage-US Navy ship USS Ramage in radio check with Norfolk at 1452. Red Thunder, probably UŠ Navy, also using trigraph call "V-3-E," working Norfolk at 1506. (MADX-MD)
- Fighting Tiger 202-US Navy, working High Voltage at 2030. Lancer 03, working High Voltage at 2036. (Rumley-NC)

Utility Logs

Continued



- 7685.5 NNN0MDC-US Navy/Marine Corps MARS, Washington, DC, calling many US Coast Guard vessels and passing short messages in Pactor-II, at 1815. (MADX-MD)
- 7708.0 CC13-Gabon Railways, ALE sounding at 1528. Mboungou, sounding at 2025. Moanda, sounding at 2046. Milole, sounding at 2057. Pcowendo, sounding, then calling CC16 at 2113. (Watson-UK)
- 7755.0 Lincolnshire Poacher-British Intelligence, Cyprus (E3), in progress at 1521. (Boender-Netherlands)
- 7889.0 Cuban "Atencion" AM numbers (V2), Sunday at 0200. Cuban CW "cut" numbers (M8a), Tuesday and Saturday at 1300. (Castillo-Panama)
- 8045.0 BVA-UK military, probably Cyprus, sounding in ALE at 1524, FCD, calling BVM in ALE at 1539. FKF, calling BVM at 1547. DKL, sounding at 1548. BVM, calling FCD at 1551. (Boender-Netherlands)
- 8070.0 UTS27-Possible Ukrainian military, with short, time-stamped, CW messages at 1630. (Boender-Netherlands)
- 8120.0 ROBLE-Mexican military, calling TAURO in ALE, at 0112. (MADX-MD)
- 8300.0 New Star Radio Station (V13), Taiwan, with Chinese 4-figure AM "numbers" and tinkly music, at 1338. (Sevart-KS)
- 8638.0 VNG-Standard Time Station, Sydney, Australia, with AM beeps at 0916. (MADX-MD)
- 8646.0 FUJ-French Navy, Noumea, New Caledonia, testing in RTTY (800/ 75) at 0920. (MADX-MD)
- 8687.0 IRM-Italian International Medical Center (CIRM), Rome, with markers offering free medical and AMVER traffic, at 0231. (Castillo-Panama)
- 8764.0 NMN-US Coast Guard Camslant Chesapeake, with marine information at 0931. (MADX-MD)
- 8861.0 Unknown-Possibly Russian VOLMET, Kirensk, at 0234. Reach JHL 4-US Air Mobility Command contract aircraft, giving position to Recife, Brazil, at 0254. (Perron-MD)
- 8965.0 E30138-US Air Force AWACS, attempting an ALE-originated direct patch via Offutt to Tinker AFB, at 2009. PLA-Lajes Air Field, ALE and voice checks with JNR, Salinas, PR, at 2011. (MADX-MD)
- 8971.0 Trident 725-US Navy, working Goldenhawk, NAS Brunswick, at 1527. Goldenhawk working Joshua 56 at 1530, and Fighting Tiger 725 at 1604. (MADX-MD) Fighting Tiger 721-US Navy, working Goldenhawk (NAS Brunswick), and High Voltage (also Brunswick), returning from mission at 1650. (Perron-MD)
- 8992.0 Reach 9062-US Air Mobility Command transport, in a patch to Hilda West via McClellan Global, interrupted by Andrews with a priority EAM, at 0541. (MADX-MD) PACAF 01-Commander, US Pacific Air Force, calling Mainsail (any station) with no joy, at 1949. (Haverlah-TX)
- 9025.0 Andrews-US Air Force, Andrews AFB, MD, with EAM at 0255.
 (Rumley-NC)
- 9090.0 Unid-U.S. CIA English-speaking female (E5), with "numbers" callup of "634" and test count, at 2205. (Perron-MD)
- 9258.0 Hotel-US military, in link coordination ("Gator" and "Timber"), with Foxtrot, Mike, Echo, Tango, and Romeo, at 0353. (Perron-MD)
- 10536.0 CFH-Canadian Forces, Halifax, NS, with RTTY (850/75) weather at 1353, and a FAX chart at 1500. (Sevart-KS)
- 11122.7 Unid-US military signal-intelligence training station, simulating a contact between fictitious "Sector Command" and "37th Brigade HQ," in voice, RTTY (170/75), and Sitor-B, at 1612. (Sevart-KS)
- 11175.0 Jambo 65-US Air Force, working McClellan Global, mentioned Barksdale AFB, at 1650. (Haverlah-TX) Titan 18-Unknown military in radio checks with Croughton, UK, at 2051. (Perron-MD)
- 11178.0 Condor-French navy unit in joint Caribbean drug interdiction, coordinating tracking links with Dutch navy "Q-9-Y," a P-3C out of Curacao, at 0105. NRN 348-Dutch Navy P-3C, working PJK, Curacao, at 2159. (Perron-MD)
- 11214.0 Dragnet Tango-US Air Force AWACS, patching Northern Lights (Tyndall AFB) via Canadian Forces Trenton, then another patch to self-identified Nightwatch 01, who gave him frequencies Z150 (5800) and Z175 (9016), at 1530. Dark Star Papa-US Air Force

- AWACS, in a patch via Trenton to Melrose, self-identified as Cannon AFB, at 2145. (Perron-MD)
- 11220.0 SAM 202-US Air Force Distinguished Visitor flight, attempting a patch with Andrews AFB, MD, at 1441. (Perron-MD)
- 11244.0 Salinas- US Air Force Salinas Global, PR, with 3 EAMs, simulcast on 15016, at 1620. Puerto Rico-Salinas alternate call, with EAMs at 1920 and 2020. (Haverlah-TX) Andrews-Andrews AFB, MD, with EAM at 1931. (MADX-MD) Offutt-US Air Force, Offutt AFB, NE, with EAM at 2329. (Sevart-KS)
- 12577.0 GMDSS alert channel, with following Digital Selective Calling loggings: Lyngby, 0654; Tokyo, 0718; Madrid, 0851; Chilung, 0950; Perth, 1042; Miami, 1205; New Orleans, 1307; Boston, 1356; Point Reyes (CA), 1647; Capetown, 1712. (Watson-UK)
- 13257.0 Canforce 3580-Canadian Forces, calling Trenton Military on the "Foxtrot" frequency, at 2008. (Perron-MD)
- 13291.0 Gander-Gander Aeradio, Canada, working Northwest 41, at 1418. (Perron-MD)
- 13528.0 "S"-Russian single-letter marker, repeating in CW at 1954. (Sevart-KS)
- 13827.5 Unid-coastal station working NNOCXS (typical shortened callsign for Navy/Marine Corps MARS digital), in Pactor-II, alternate frequency is 7685.5, at 2037. (MADX-MD)
- 13876.7 Unid-Probably Egyptian Embassy, Belgrade, calling Cairo in FEC, then switching to ARQ for traffic, at 1548. (Watson-UK)
- 13977.0 HBD20-Swiss MFA, Bern, with encrypted ARQ traffic for the Tripoli embassy, at 0737. (MADX-MD) HBD20, with encrypted ARQ for Tripoli, at 0944. (Watson-UK)
- 13980.3 RFFA-French Ministry of Defense, with weather in ARQ, at 1801. (MADX-MD)
- 14441.7 Ùnid-Egyptian MFA, relaying an ARQ message from Rabat to many recipients, at 1940. (MADX-MD)
- 14636.7 RFLI-French Forces, Fort de France, with ARQ traffic for Cayenne, at 2019. (MADX-MD)
- 17215.7 LOR-Argentine Navy, Buenos Aires, with RTTY (170/75) grid references at 1256. (Hall-RSA)
- 17487.0 DLA303-US Defense Logistics Agency, CA, coordination station in SHARES Presidential Inauguration activation, exchanging linkquality data with AAT3BFMARS, US Army MARS gateway, DE, at 2213. AAT3BF, link data with NHQARC, American Red Cross National Headquarters, Arlington, VA, at 2215. (Stegman-CA)
- 17916.0 SDJ-Stockhom Radio, working Reach 123, US Air Mobility Command enroute to Skopje, at 0917. (Patrice Privat-France)
- 18560.0 BMF-Taipei Meteorological, Taiwan, with a fuzzy weather FAX (120/576), at 0730. (Hall-RSA)
- 19131.0 Flint 411-US Drug Enforcement Agency aircraft, patching Flint 500 via Atlas (DEA comm, IA), then in a radio check with aircraft Coast Guard 6003, at 1837. (Perron-MD)
- 19242.0 9SG15-Probably "Goldmine," Katanga, Congo, with mining information in French, then military news in German, in 200/200 Pactor, at 1557. (Hall-RSA)
- 19724.7 Unid-Russian vessel with RTTY (170/50) traffic to Kaliningrad, then receiving a personal message from another ship, at 1533. (Hall-RSA)
- 20631.0 Chalice Bravo-US Air Force AWACS, working Elmendorf in ALE and voice, at 1912. (MADX-MD)
- 21865.0 Unid-MFA, Warsaw, Poland, with Polish-language messages and news for Brasilia, in ARQ at 1256. (Hall-RSA)
- 22376.0 NRV-US Coast Guard, Guam, with an FEC cyclone warning for the US Embassy in Mauritius, at 1505. (Hall-RSA)
- 22857.7 RFVI-French Navy, Le Port, Reunion Island, idling in ARQ at 1612. (Hall-RSA)
- 22912.7 RFHI-French Forces, Noumea, New Caledonia, idling in ARQ at 1616. (Hall-RSA)
- 23053.9 Unid-New station, probably the Turkish Embassy, Kinshasa, Congo, with FEC traffic in Turkish, possibly related to the Kabila assassination, at 0821. (Hall-RSA)
- 24268.0 KUW-UK military (might be the Army-LVH), probably Kuwait, calling CYP, probably Cyprus, in ALE at 1425. PRI, sounding at 1440. (Watson-UK)
- 26241.7 RFVIT-French Navy, St Denis, Reunion Island, with French military traffic in ARQ, at 1023. (Hall-RSA)



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Digital Digest

Stan Scalsky sscalsk@mail.ameritel.net

High Speed Modem Decoder Finally Here!

his month we follow up on February's "International ALE Networks" feature and detail preliminary beta-test results of some new modules for the Hoka Code30 and 300 series of decoders.

ALE Networks Update

No sooner had we gone to press with the February 2001 "International ALE Networks" feature, than more facts about the various networks detailed there came to light. Some "unidentified" and "tentative" networks may be moved into the "identified" category. We will be adding a new section to the Utility Monitoring Central website to track and maintain details of the various networks. Go to http://www.mindspring.com/~mike.chace and follow the "HF" link to ALE Networks.

♦ The "BB1" Network

A number of monitors have independently reported Hebrew-speaking operator chatter from aircraft following ALE calls. It is therefore very likely that this network is operated by the Israeli Air Force.

♦ The "X7, A5" Network

A few atypical ALE calls were spotted on this network – ETATMAJOR and RELJADIDA. The latter of these calls probably denotes the Moroccan town of El Jadida. Other snippets of information point to this network being operated by the Moroccan Army.

The "UK Military or Diplo" Network

This network has been confirmed as being operated by the British Army's Royal Signals Corps. This branch of the Army is responsible for the deployment of communications infrastructure for both permanent bases and missions, for example to Bosnia. The British Army web pages (see resources) mention a large number of operational locations which provide the tie-in to the ALE identifiers active on this network.

Over recent weeks, the new identifiers "BVM" and "BVA" have come to light (as yet unidentified) regularly communicating with "DKL" (the Sovereign Base at Dekhelia, Cyprus) on the new frequency of 16321 kHz (USB).

The Canadian Military Network

There has been some question as to whether Network 2 is part of the Canadian Forces set-up. Some monitors have reported the calls in the CGE, CRC-series to be Chilean in origin. More monitoring will be required to verify this information.

The "2222, 3333, 5555" Network

A number of reports indicate that this network is run by the Moroccan Air Force.

♦ The "AFO, KAI, CH" Network

Some great detective work by LDO finally identified this network as belonging to the bases of the Swiss Headquarters Support Unit (SHQSU) of the OSCE (Organization for Cooperation and Security in Europe). The SHQSU was sponsored by the Swiss government as part of ongoing relief operations in Bosnia-Hercegovina.

After closing their regional offices in Tuzla, Mostar and Banja Luka in late 2000, they brought their 46 soldiers back to Switzerland at the end of 2000 and closed the main office in Sarajevo. The "down-building" will be finished as this column goes to press.

New Modules from Hoka

Although still in the beta-testing stage and not yet commercially available, we're excited to report that the latest versions of the Hoka Code30 and Code300 decoder software have several new modules added. These are:

- ARINC HF Datalink
- MIL-188-141A ALE
- MIL-188-110A 2400bd PSK HF modem
- STANAG4285 2400bd PSK HF modem
- STANAG4529 2400bd PSK HF modem

We've been wondering when the decoder manufacturers would catch up with the latest onair systems, and Hoka's efforts represent a real step forward. We've been lucky enough to have had these offerings on test, and thanks to permission from Horst at Hoka, we can report our initial findings here.

HF Datalink

As reported in the previous issues of *MT*, ARINC are continuing to build their global HF aircraft data system and now have over a dozen transmit sites in operation. The signal is an adaptation of the MIL-188-110A waveform and is used to provide a number of functions analogous to the well-known VHF ACARS system.

MIL-188-141A ALE

This module performs decoding of the standard ALE protocol. In our tests, the Hoka implementation appears to be somewhat more sensitive than that of the PC-ALE software. This is almost certainly due to the hardware involved (dedicated DSP vs general purpose soundcard) rather than the software itself. Reliable decoding from our

Code30 is obtained with signals barely above the noise-floor of our WJ8715 receiver.

MIL-188-110A 2400bd Modem

This module decodes the 2400bd HF modem signals now very common on HF. It automatically senses the data rate (most signals appear to use 600 or 1200bd) and interleaver in use (short or long) – the longer interleaving of data helping increase protection in noisy conditions. So far, this module has revealed a very active Spanish Navy network, MS Exchange email between ships of the Royal Swedish Navy, and a very active network carrying Ethernet traffic (demonstrating why these modems are so popular now) and believed to be run by the US Coast Guard. As is the case with many modes, 110A traffic often carries addresses or other identifiers which indicate the user. Here are some frequencies carrying 110A traffic:

Swedish Navy 17254 kHz USB Spanish Navy 12266, 13089, 16408, 17266, and 17290 kHz USB US Coast Guard 5105.5, 5193.5, 6961, 6996.5, 10294, 10343, and 12372 kHz USB

Any of the Swedish Diplomatic channels noted in our recent International ALE Networks feature will also carry 110A traffic, although these are encrypted X.25 messages.

STANAG4285 2400bd Modem

Again, a very common system these days, STANAG4285 is in use by a large number of NATO countries. The Code 30's module decodes these signals, but unlike the 110A standard, STANAG4285 does not provide for so-called autobauding where the receiving modem can sense the data rate of the incoming signal. In practice this means that one must try various combinations of data rate (75, 150, 300, 600, 1200, & 2400bps) and interleaving (short, long and uncoded). Disappointingly, so far, with over 100 signals analyzed, all appear to be encrypted.

STANAG4529 1200bd Modem

Rather less common than either the 110A or STANAG4285 standard, we have yet to catch one of these burst modems long enough to verify the operation of the Hoka module.

All in all, this is exactly what we've been waiting for. The implementations are faithful to the original specifications and produce reliable results. Hopefully we'll soon be able to announce the final version. Now, where's that PacTOR-II modem....?

Shortwave Broadcasting

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Is Radio Austria International a Sinking Ship?

Roland Machatschke, director, posted this essay (in part) on the station's website:

In its 20 January, 2001 issue, the daily newspaper *Die Presse* makes the above claim, without adding a question mark. In the year 2000, funding was reduced by almost 30 percent compared to 1999. In 2001, the Republic of Austria is only providing roughly half of the funding it paid for its international broadcaster in 1999. For the year 2002 no further funding is planned. Radio Austria International was forced to let go half of its roughly 100 regular staff and freelancers within the space of six months.

Programming itself had to be changed to concentrate on the core responsibilities of an international broadcaster, namely news and current affairs. Thus all music programmes were discontinued, a decision not easily made by Austria's voice to the world, considering the fact Austria is regarded as the "land of music." All told, 26 of the 36 magazine programmes were cancelled along with all ROI produced news broadcasts and current affairs programmes with the exception of the *Österreich Journal*, which is broadcast Monday thru Friday.

The other language services have remained by and large un-

changed, because with their 13 percent share of the entire programming it would have been difficult to make further cuts without endangering their very existence. Instead of being on the air to overseas target areas for several hours a day, ROI can usually only be heard there for one hour daily. This was a very painful spending cut for us. Radio Austria International has more listeners than some of the critics here at home would want to lead us to believe.

Radio Austria International is prepared for the challenges of the future. It is not a "sinking ship in the short-wave ocean" as *Die Presse* wrote. Even though it has considerably less money to spend than the governments of neighbouring countries such as the Czech Republic, Slovakia or Hungary allocate to their international radio programming, Radio Austria International is able to fulfill its core responsibilities. But there a great danger that the "ROI ship" will be sunk by outside forces. When half the crew is forced to leave the ship and when the engines are only permitted to run at half speed then there are limits even to our manoeuverability. (From *http://roi.orf.at/frameall.asp?url=/english/en_intern_thema.html* (c) 2001 Radio Österreich International via John Norfolk)

AUSTRALIA [non] In late January, R. Australia began some relays via IBB on Tinian, and, dropped after only one day, Saipan (Dan Ferguson and Bob Padula) Probably changed by now for A-01, effective March 25, schedules for this and many other stations not yet available to us at presstime (gh)

BRAZIL R. Nacional da Amazônia is back on 6180. Programming is a bit different from the old RNA, a lot of links with R. Nacional do Rio on 1130 (Rudolf W. Grimm, SP, radioescutas) 6180, strong around 0901-0928 (Phil Ireland and Craig Seager, NSW, Australian DX News)

R. Cultura's audio link is for great Brazilian music is http://www.tvcultura.com.br/radioam/radioam.asx as heard on 17815, or http://www.tvcultura.com/br/radiofm/radiofm.asx for their FM side, classical (gh)

CAMBODIA [non] Since it was denied a transmitter in Cambodia, the Sam Rainsy opposition party started weekly shortwave broadcasts Feb 17 from an unidentified Asian country, Saturdays 1000-1100 on 15455, known as Voice of Justice, or phonetically in Cambodian, "Samleng Yutethoa." May increase to daily. See http://www.samrainsyparty.org/ (AFP and Nick Grace C., Clandestine Radio Watch)

CANADA Scott Snailham - Production Assistant/Evening Producer, CHNX/CHNS/CHFX Halifax tells me the current contact for QSL response is CE Mark Olsen; Rp is appreciated. CHNX 6130 kHz was off the air in Feb due to difficulties with the transmitter. It is uncertain if the SW outlet will return as "the transmitter is not suited for shortwave" (Joe Talbot, Alberta, hard-coredy)

CHECHNYA [non] U.S.-funded Radio Liberty said it would go ahead with plans to broadcast in the Chechen language despite objections by a Russian minister. Congress had mandated the Prague, Czech Republic-based station to start transmissions in the languages of Russia's turbulent North Caucasus region (Andrei Shuksin, Reuters via Brock Whaley)

CHILE Transmitter site announced for Voz Cristiana is "Calera de Tango" (Horacio Nigro, Uruguay, DXLD) [non] 1700 in Miami Springs is running parallel to Radio Voz Cristiana - Santiago (still IDs as WAFN) and mentions an FM outlet in Panama City (Keith T. Willis, FL)

CHINA China National Radio 5th programme (CNR5). ID in Mandarin:
"Zhongyang Renmin Guangbo Diantai Xianzai Kaishi Dui Taiwan Guangbo"
("This is the Central People's Broadcasting Station. We now begin our broad-

cast to Taiwan"). First Programme: "Di Yi Tao Jiemu" ("This is the First Programme"). Some programmes in Amoy, Hakka. Address: 2 Fuxingmenwai Dajie, Beijing 100866, China. Tel: +86 10 6851 5522. Schedule daily: 0055-0615 on 549 765 11100 11935 15710; 0955-0005 549 765 5090 7567 7620 9380 11160 (BBC Monitoring)

All times UTC; All frequencies kHz; *before hr = sign on, *after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-01=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

[non] In late Jan I found new CRI English broadcasts on 17720 at 1400 and 1500; wide, strong, steady signal, but degraded modulation, typical of Cuban relays. Not the same transmitter as 9570 which overlapped it before 1400 (gh) Same kind of skip-over flutter WYFR has here, indicating a nearby site. If from Cuba, would strongly suggest it is from the new Chinese-built (two years old) transmitting and monitoring facility, DFed by the FCC at 22.56.00 N, 82.23.00 W (near Bejucal), as opposed to the Bauta site for most RHC SW transmitters (Terry Krueger, FL, hard-core-dx)

COLOMBIA Radiodifusora Nacional on 9634.97 is now audible almost all night in Denmark with a surprisingly good signal from 2230 to 0500 - except for 0100-0200 when 9635 also used by Radio Sweden (Stig Hartvig Nielsen, hard-core-dx)

On 5956.44, Caracol Villavicencio at 0856 Talk, Caracol net IDs and time checks. Very good signal (Mark Mohrmann, VT)

6233.0v is new frequency for clandestine Voz de la Resistencia, Bloque Oriental, until 1235* with good quality, s/off with usual Compañeros de la FARC. Also at 2140 with Notienfoque Voz de la Resistencia (news) (Yimber Gaviria, Colombia, DX Listening Digest) La Voz de Resistencia - not exactly loud and clear - but with a perfectly readable signal and lots of nice danceable music from tune in at 2220. By 2230 a couple IDs, revolutionary march and sign off at 2233 on 6233.72 or 6233.73 (Stig Hartvig Nielsen, Denmark, hard-core-dx)

On 2620.26, at 1100 after Mexican music ID "Desde Palermo, la república de Colombia, transmite para Ustedes su emisora Micrófono Cívico, la emisora del Pueblo, HJWD 1310 kHz..." Harmonic from MW 2 x 1310.13 (Björn Malm, Quito, Ecuador, SW Bulletin via Thomas Nilsson)

COSTA RICA To avoid interference, RFPI moved from 7480 to 7450, and expanded to 0000-0800 (gh) RFPI carried a pilot for Live Wire Independent News in Feb, Mon-Thu 1730, companion to the weekly Freespeech Radio News Fri 1730, all repeated 6 and 12 hours later. LWIN is created by the National Radio Project (NRP), producers of Making Contact, and live specials, such as UnConventional Coverage and World Trade Watch; featuring fresh, lively, newsworthy stories not often heard in mass media (RFPI) Also via public radio stations and website http://www.radioproject.org/lwmoreinfo.html (Richard Cuff, swprograms)

On 5953.90, Radio Casino, Limón, reactivated, excellent signal every morning at 1130, always with Mexican music

(Björn Malm, SW Bulletin via Thomas Nilsson) **DOMINICAN REPUBLIC** Santo Domingo,
5008.85, 2328-2340 ID first as "La Voz de la
Esperanza" and then "Radio Cristal
Internacional", news, mx, SIO 343 (Daniele
Canonica, Switzerland) R. Cristal frequency
5009.78, *1101-1141 relaying some other AM

station in the morning; music always clear, but voice always distorted, a very different format from Cristal's all-bachata canned style (Terry Krueger, FL, hard-core-dx)

6025.05, R Amanecer Internacional, Santo Domingo, 2345-0005, Christian songs, sermon, ID in Spanish, reactivated (Michael Schnitzer, Germany, Conexión Digital)

ECUADOR HCJB, 21455, heard with much stronger signal than before and not just USB. I know they were a test site for DRM on 21455 earlier. Would it have anything to do with that? (Ricky Leong, QC) Beware of WYFR which was also using 21455 at 1545-1945, HCJB 2000-1530 (Wolfgang Büschel) DRM tests in January from Pifo used 30 kW PEP linear transmitter (Hans Linkels, Chairman of DRM System Evaluation Group, http://www.21MHz.com) And we kept using it for analog instead of 1 kW (Doug Weber, Frequency Manager HCJB, via Allen Graham, CA) HCJB tested live streaming three days in February, planning to begin continuous streaming in March; http://www.hcjb.org/streamindex.php (Yvonne Kennedy, HCJB via Richard Cuff, swprograms) We would prefer to have on demand audio to listen to favorite programs at our convenience (Larry Nebron, Bill Whitacre and gh)

On 4840.00, Radio Interoceánica, 0208-0342+, apparently reactivated with new program format. No traditional Andean music heard. Pop ballads and "música romántica". Highly produced canned IDs for "Interoceánica FM...103.5...", still going at 0342, very good signal, much stronger than in the past (Mark Mohrmann, VT, DX Listening Digest)

ERITREA UNMEE, UN Mission in Eritrea and Ethiopia, started broadcasts in English, Tigrinya, Tigre Arabic via national channels here, Tue 1030-1130 on 7100; 1400-1500 on 7175; repeated Wed 0700-0800 on both (BBC Monitoring, Media Network) Frequencies are all Eritrean state radio, Voice of the Broad Masses of Eritrea (Chris Greenway, BDXC-UK) Radio UNMEE has Real Media files of their programs at http://www.un.org/Depts/dpko/unmee/radio.htm (Hans Johnson, Cumbre DX)

ESTONIA Radio Tallinn is operated by Estonian Radio, aimed at Estonian and foreign nationals in the Tallinn area. As well as its own programmes in English, it carries relays of BBC World Service, Radio France Internationale, Radio Sweden and Deutsche Welle. The former Radio Estonia external service aimed at listeners abroad ended with the closure of Estonian Radio's shortwave transmitter on 5925 kHz on March 1st 1998. Programmes are NOT subject to Summer/Winter time changes. English news is Tue-Fri 0400-0415; News and Estonia Today Mon 0400-0500, repeated 0900-1000, and available on demand from http://www.er.ee/eng/uudis/ (© BBC Monitorina)

GABON You can now listen to Africa Number One via http://www.africa1.com but we can also be heard perfectly well on SW in North America, Japan, Australia, and even in Siberia (Georges Courreges, ANO via Mike Terry, hard-core-dx) Finally found the link, http://www.comfm/com/live/radio/africa/playerw.html (gh)

GEORGIA Radio Khara is on 4875 from Dusheti at 1700-1730 on Monday and Thursdays with a repeat of the previous day's broadcasts at 0500-0530 on Tuesdays and Fridays. Radio Khara is sponsored by the Georgian-Abkhazian Relations Institute in Tbilisi. "Khara" means "We" in Abkhazian. The accent of Radio Khara is on Georgian-Abkhaz reconciliation, and the history of these two people who have lived together for centuries. The Institute does not have a website (Goulnara Pataridze, Kai Ludwig, Hans Johnson, Cumbre DX)

GREECE ERT news. I had telephone talkings with the technical persons of the ERT 3. Indeed the Continental transmitters from IBB RFE donated by the VOA have been received and they are still in their packs, for Thessaloniki at least. The facility of Perea/Thessaloniki has received two 250 kW with their antennas. However in order for these systems to be installed, a management approval is required (bureaucracy ...). (Zacharias Liangas, Greece, BC-DX)

GUYANA On 5948.9, Voice of Guyana, at 0928-0947: Hindu devotional music, 0930 promo for National Unity Rally, ID "Voice of Guyana". Ad for on air funeral announcements. Good S9 signal with moderate fading. ID again at 0940, then reading of verses from the Bhagavad Gita. Not more then a half second after the host ended with "Hari Om Shanti Shanti Hari Om", a huge carrier from WYFR on 5950, buried the signal. How ironic! (David Hodgson, TN, DXLD)

INDONESIA Radio Republik Indonesia now has web site under construction at: http://www.rrionline.com/ RRI Overseas Service home page is at: http://www.rrionline.com/rriframe_overseas_main.html (TDP via Pentti Lintujärvi, Hard-Core-DX)

IRAQ Get set for an exciting year for the airwaves over Iraq. The Worker-Communist Party of Iraq maintains a separate webpage for their station: http://www.wpiraq.org/english/radio.htm (Nick Grace C., hard-core-dx) see also KURDISTAN

ISRAËL IBA began in Feb a good new frequency for English at 0500, 7500. Summer timing 0400 and frequency may change (gh)

JAPAN Timesignal station JJY is to be decommissioned as of March 31, 2001.

Hurry to hear it on 8000 or other frequencies (http://www.iprimus.ca/~hepburnw/dx/time.htm via Carlos Felipe, radioescutas)

KOREA NORTH The Frontline Soldiers station seems to be active on an irregular basis on all three frequencies (1614v, 2624v, 3025v), approx. 1400-2000. Purpose is (probably) entertainment for North Korean soldiers stationed along the DMZ (hence the frontline). Contents are mainly radio dramas with occasional music and political talk. Programs are not parallel when two or three are on at the same time. They may all be feeders for local

rebroadcasting. "Chonyon Chobyong durul wihan Bangsong" (lit. "Radio for Soldiers on the Frontline") ID can be heard at s/on and a few minutes after the half-hour (Sonny Ashimori, Japan, Cumbre DX)

Found by chance in a search is this website about R. P'yongyang by someone who seems to have visited the country: http://www.simonbone.com/ pyongyang.html (Ken Halpert, DX Listening Digest)

KOREA SOUTH KBS Radio One is 24 hours on 3930 (BBC Monitoring)

KURDISTAN One issue of the Kurdish DX Summary Chart or "Kurdistan SW Target List" can be found at: http://www.clandestineradio.com/martin/crw-kurd.html (Clandestine Radio Watch)

Voice of the People of Kurdistan. (Kurdish: "aira dangi gelli kurdistana", Arabic: "sawt sha'b kurdistana") is the official radio station of the Patriotic Union of Kurdistan (PUK) led by Jalal Talabani. It broadcasts from Al-Sulaymaniyah in Iraqi Kurdistan. According to the radio's website, it was established in 1979 under the name "Voice of the Iraqi Revolution" and adopted the current name in 1983. Languages: Arabic, Multilingual, Sorani Kurdish, Hawrami dialect. Address: PUK, Postfach 210231, 10502 Berlin, Germany. E-mail: puk@puk.org Web Site: http://www.puk.org Daily 0300-0700, 1345-2100 on 4060, 6995 (© BBC Monitoring)

[non] WCPI, the Worker-Communist Party of Iraq, launched R. Bopeshawa Mon, Wed, Fri in Arabic and Thu in Kurdish at 1500-1600 on 9450 from undisclosed location. "Bopeshawa," meaning "Forward" in Kurdish, is also the name of the party's newspaper. Listeners are invited to contact the station via e-mail at radio@wpiraq.org Also spelt Bopishawa, Bopishava (Martin Schöch and Nick Grace C., Clandestine Radio Watch) ID in Arabic is Itha'at ela Al-Amam Radio Forward, ela (to) al (the) Amam (front). PO Box 22266, London SE5, UK (Hans Johnson, AZ, Cumbre DX) Transmitter location revealed itself by leakthrough of interval signal of R Bulgaria (Olle Alm, Sweden, SW Bulletin via Thomas Nilsson, and Noël Green, BC-DX)

MALAYSIA RTM is absent from 4845, which carried their Radio 6 service in Tamil 24 hrs. SE Asia tropical bands are now sounding decidedly empty. The number of active tropical band stations in the region, excluding Indonnesia, is now down into single figures, most of which operate for only a few hours a day. Only channel with really good reception is 7295, in English 24h (Alan Davies, Hat Yai, Thailand, Electronic DX Press)

MÉXICO Starting Feb 1, the new management of R. Educación has reduced its SW-only broadcasts on 6185 to six hours a day, 0000-0600 UT, then simulcasting MW for the rest of the night until 1200 [one hour earlier during DST]. This is a step backwards, less programming for an international audience, following a doubling of the power in 1999. Listeners' opinions about this are invited to Radio Educación, onda corta, A.P. 21 9 40, C.P. 0 40 21, México D.F. (Deyanira Morán, yanimoran@hotmail.com via Noticias DX)

XEQM, 6105, Mérida, Yucatán, reactivated since Jan 31, weekdays opening at 1200 with newscast called Radio Noticias, from XEUL, Foro 930; on Sat it relayed XEMH 970, Candela Tropicaliente instead. Promo says the new name for this is "RASA Onda Corta", slogan "Lo Mejor de nuestras

estaciones para el Mundo" (Hector Garcia Bojorge, México DF,

MUNDO RADIAL)

NETHERLANDS [et al.]

Digital Radio

Mondiale now
publishes ad-



vance details of future field test transmissions on shortwave. These should be available on the DRM Website at http://www.drm.org but will also be available on our Media Network site http://www.rnw.nl/realradio/html/medianews.html (Andy Sennitt Radio Netherlands, hard-core-dx)

PAPUA NEW GUINEA R. Sandaun on 3205 returned to the air Jan 3, 2001. Noted at a Graylands DXpedition, and since (Don Nelson, Oregon, DXLD) Radio Western Highlands, Mt Hagen, 3375: This one has been active again since November. Heard at 0925 with current affairs program, relayed from Port Moresby & also on the Karai Service from PM on 4890 (Craig Seager, Australia, DXLD)

PERÚ 4580-4610v ex 5421v/x5609v, Radio San Juan de "Saíque"? with comunicados for Jaén department; starts around 2345 and closes between 0300 and 0330. (Björn Malm, Quito, Ecuador, SW Bulletin) It is "distrito de Sallique", and the station then probably "R San Juan, de Sallique". (Henrik Klemetz, DXLD) Over four nights in less than a week, R. San Juan was heard as early as 2340, as late as 0310 on 4582.1, 4584.9, 4588.4, 4577.8. On a visit to Chiclayo I was able to visit R. Imperio, and was shown around the offices and studios. They said the schedule was 0845-0500. But R. Horizonte is in a dangerous neighborhood, surrounded by high walls and a big metal door. They reluctantly gave me some info about the station through a small window (Pedro F. Arrunátegui, Lima, Chasqui DX)

The Celendín station on 4655.0 previously known as R. Celendín; R. La Voz del Campesino; and R. Ecos del Edén, by mid-Feb was IDing as R. Nuevo Amanecer, as early as 2340-0305* to return at 1000, with Andean music, comunicados (Pedro F. Arrunátegui, Lima, Chasqui DX)

Around 6270, varying 6225 to 6297, is new Radio El Libertador, provincia de Utcubamba, departamento Amazonas at 0050 announced as testing; then religion after 0100 and no IDs (Björn Malm, Quito, Ecuador, SW Bulletin)

RUSSIA The 12th of April this year marks 40 years since humanity penetrated outer space and the world's first cosmonaut was Yury Gagarin of Russia.

Shortwave Broadcasting

Voice of Russia offers a special quiz, broadcasts the questions and terms on a regular basis. Or visit http://www.vor.ru Winners will be awarded special prizes, best works put on display, deadline April 12. Winners will be given June 15. Write "For space quiz" on envelope to: "Voice of Russia", 25, Pyatnitskaya St., 113326 Moscow, RUSSIA. Or fax 095 950-56-48 (VOR via Sergei Sosedkin)

Radio Miks-Master in Yakutsk, 4940, is frequently misinterpreted as a private radio station. This is not the case. It is a channel of NVK "Sakha" which is the national state broadcasting company of the Republic of Sakha (Yakutiya), financed by the republic's administration and included in the structure of VGTRK (All-Russian state radio & TV broadcasting company) as the regional broadcasting company for Yakutiya (Bernd Trutenau, Lithuania, BC-DX) Goes off at 0930 (Olle Alm, Sweden, BC-DX)

SICILY Received a full data, typewritten and signed, verification letter direct from "Naval Radio Transmitter Facility, Niscemi, Sicily" indicating the AFN broadcast on 6847.5 kHz on August 13, 2000 was from that station but they did not verify another report for 16847.5. I originally sent reports to Naval Media Center Washington but received letters back stating neither was a published / authorized frequency for AFN. So I sent reports to NAVCOMTELSTA Sigonella. My full data typewritten QSL has a return address of PSC812, Box 3290, NRTF Niscemi, FPO AE 09627-3290. In part it states, "This signal originated from Naval Radio Transmitter Facility Niscemi, Sicily". (Lee Silvi, OH, DX Listening Digest) Perhaps in Niscemi is only the antenna or radio relay. Airport, base and command are in Sigonella (Salvo Miccichè, Sicily, hard-core-dx)

SWEDEN [non] There's a new relay swap, between RCI and Radio Sweden. Radio Sweden is going out via Sackville on 9560 kHz at 0230-0259 UT in English (Bill Westenhaver, RCI) Very good on 9560 at *0230 crash-start. Direct 9495 still on, barely audible here, runs as much as 16 seconds behind Sackville; one or both must be playing back pre-recorded tape, not simultaneous feed, so gap is unpredictable. Kim Elliott determined that a WRN feed was being used. Magnus Nilsson of Terakom admitted on MediaScan that Swedish language broadcasts were first priority for Sackville relays, but a convenient way to feed them had not yet been established (gh) TAIWAN CBS on new 15060 has also been putting a very good signal into here

TAJIKISTAN Harmonic 13905 at 1554 from Tadjik R, Dushanbe, 3 x 4635, fair at peaks (Tim Bucknall, UK, harmonics@yahoogroups.com)

mornings roughly 1200-1500 (gh, OK)

THAILAND R Thailand external outlets on 9655 and 11905 via Pathumthanee site are inactive. Only IBB Udorn Thanee is in use (Uwe and Suree Volk, Chiana Rai and Banakok, BC-DX)

Chiang Rai and Bangkok, BC-DX)

TURKEY Hunting around the Voice of Turkey website for their current English feature program schedule, PROGRAMMES is a dead link, but under RE-VIEWS we get a list of programs, and days, but no exact times, which may or may not be up-to-date. See http://www.tsr.gov.tr/en/reviews/ingiliz.shtml (gh))

UK Starting in February and lasting six months is a monumental series on BBC WS, The Story of Africa, on the African streams only, Fri 0930, Sun 0430 (when Ascension 7160 and 11765 should be best for us) and 0730, Tue 1630, a history of the last bimillennium. See http://www.bbc.co.uk/worldservice/africa/features/storyofafrica/index.shtml (gh)

U S A Check out http://www.wisclean.org - I was alerted to this story by a letter to the editor in Radio World, 1/17/2001, pg 62. I know Mike Dorrough. He is a nice fellow, and an advocate for getting information to the blind. He wanted to start a SW radio station to provide info to the blind. His efforts have been halted (Fred Vobbe, NRC DX Audio Service) There is a lot more to this than the SW angle. Apparently he has been done a great injustice by a number of public officials, including Gov. Tommy Thompson, named to alleged Pres. Bush's cabinet. Here's an excerpt we found referring to the SW project:

"Judge Steven D. Ebert has illegally taken Mike Dorrough's land, rendering a near-fatal blow to 'Project Beacon', Dorrough's shortwave station and archiving project, by and for people without sight, but blessed with an inner vision for a new and better kind of radio. Tragically, this inner vision may never be realized." (gh)

On the last day of the Clinton Administration, VOA announced more services to be closed: Thai, Uzbek, Portuguese to Brazil. Reduced: Bulgarian, Romanian, Slovak, Turksih. Merged: Armenian, Azerbaijani, Georgian. 36 jobs to be eliminated by August. Savings will allow improvement of: Arabic, Indonesian, Hindi, Macedonian, Russian, Spanish to Andes. VOA Director Sandy Ungar did not resign like other political appointees, maintaining his position did not require this (Kim Elliott, VOA Communications World) Noncitizen Employees Could Bear Brunt of VOA's Latest Round of Layoffs: http://www.washingtonpost.com/wp-dyn/articles/A27547-2001Jan21.html (via Bill Westenhaver, Mike Cooper) Cutbacks at VOA prompt critical chorus: http://www.csmonitor.com/durable/2001/02/08/fp18sl-csm.shtml (via Jim Moats, OH)

Radio Free Europe/Radio Liberty started publishing every Friday Media Matters based on reports by RFE/RL broadcasts and other sources. To subscribe e-mail mm-request@list.rferl.org with the word subscribe as subject. Or you can access this at: http://www.rferl.org/mm/ (Krzysztof Rybus, Poland, via Wolfgang Büschel) Like BBC Monitoring but freely accessible and concerning only the countries RFE/RL serves, eastern Europe, CIS and vicinity. Not much relevant to SW or clandestines but there could be (gh)

See WWCR's Specialty Program Guide, a quick way to find DX, musical, entertainment and info programs other than preachers and far-right

talkshows: http://www.wwcr.com/cr_specialty_pgms.html (gh) WWCR runs a promo that they are "targeting Japan and the Far East at 1000-1100 [DST timing] on 7435". This seems odd, since all WWCR's rhombics are aimed from NE to E, this one registered at 46 degrees, nowhere near Japan's direction. So I asked George McClintock how he justifies this; his reply in summary:

The international broadcasting community dislikes rhombics because they have sidelobes, but that is exactly why we like them. This happens to have a good sidelobe toward Japan, and we have been getting reports from there. As a matter of fact, our sidelobes have more power than must US stations have on their main lobes from other antenna designs! Another good thing about rhombics is their low vertical takeoff angle, which favors propagation to greater distances. Ours have been modified to be as low as possible, all below 10 degrees. This is a disadvantage for close-in coverage, but we make up with sheer power, gain and sidelobes. The window to Japan is two hours maximum, when 7435 is near the FOT [optimum frequency] and at that time of day there has not been much demand from programmers in North America, so we are trying promoting it as a service to Japan and the Far East.

Although such a low frequency as 2390 was necessary previous seasons for close-in coverage at night in sunspot lows, we have found that it is subject to ducting, and there are few receivers capable of receiving it, so we plan to reduce usage of it from A-01 season; the Brother Stair service gets better results from 7435 which will be expanded; previously it suffered from a 1500-mile skip zone overnight (George McClintock, WWCR)

WWFV says it plans to use frequencies around 14.900 and 3.290 MHz (rec.radio.shortwave via John Norfolk)

WBCQ-3, The Planet, started new Saturday afternoon musical/entertainment series on 17495-CUSB from Complex Variable Studios and Marion's Attic at 1800-0100 UT. We also plan to add another nighttime service, most likely in the 5 MHz band that we will diplex into our 709 foot rhombic. Most likely in the spring or as soon as we can line up clients (Allan Weiner, WBCQ Central)

Paul Harvey's noon news can be heard on SW at its first feed-time, 1640 UT [DST: 1540] as noted on WFLA 25870 NBFM. This is to allow Eastern Zone stations time to pre-tape it and insert local commercials in noon+ airings, but a number of stations, even in western timezones broadcast it at this first opportunity and get it over with (gh)

Received full-data letter confirming WLW-700's cue-link on 26450, after follow-up. Says it is omni 5/8 wave antenna with 70 watts; V/S Gary Barnett, 1111 St Gregory, Cincinnati OH 45202 (Dinan Rogério Honório de Oliveira, Brazil, DXCB @-TIVIDADE DX via radioescutas)

[non] WYFR Family Radio tested via Jülich, Germany for two weeks in Feb, 1600-1800 and 1900-2200 13855, 1800-2100 15775 (Kai Ludwig, Germany, World Of Radio)

GBGM of UMC, 15485 via Germany, at 1700 with wonderful reception. Very regionally sensitive programming, emphasizing the sad occurrence in Congo with the death of Kabila. This day was dedicated to mostly music, both inspirational and secular, all sounding appropriate for Africa. This program is in stark contrast to the "Americentric" programming of other religious groups. Worth listening to. Parallel 13810 was good, with some splash from 13815 (Walt Salmaniw, BC, DX Listening Digest)

OUR CURRENT AUDIO – Finally have put together all our audio links on one convenient page, as well as to summaries/scripts, for World Of Radio, Continent Of Media, Mundo Radial, Shortwave Year In Review: http://www.angelfire.com/ok/worldofradio/Audiomid.html From April 1, all WOR times on WWCR and WBCQ shift one UT hour earlier for DST (gh)

VATICAN The pope named 37 new cardinals, one of whom is Rev. Roberto Tucci, 79, Italian, president of Vatican Radio and main organizer of the pope's foreign trips (Reuters via NY Times via Bill Westenhaver) Cardinal Tucci and two other Vatican officials face possible jail time, charged with violating Italy's very strict standards on electromagnetic fields emitted by radio transmitters, i.e. Vatican's Santa Maria di Galeria. They were to go on trial March 12. Vatican maintains even if true, Italy has no jurisdiction (RN Media Network)

VENEZUELA [non] Tnx to a tip from Henrik Klemetz, checked out Sunday morning program Aló Presidente via Cuba. First hour at 1400 one week promoted tourism to Mérida, then Pres. Hugo Chávez came on at 1500 for more than three hours until 1818*. Cuban announcer gave 6140, 9505, 9820-USB, 11705 and 11875. Until 1459, 6140 was best; then 11705 after NHK/Canada closed. The others confirmed but blocked or distorted. At http://www.unionradio.com.ve this show is listed only for 1300-1500 UT (gh)

YEMEN Republic of Yemen Radio, English Service is at 1800-1900 daily, repeated at 0600-0700 next day on 9780v; at other times in Arabic. Address: PO Box 2371, Sanaa, Yemen. Tel: +967-1-231181. Fax: +967-1-230761 (© BBC Monitoring)

During a recent stay in the country, I found, during local day-time, 5950, 6135 & 9780 are often on the air simultaneously with the Sana'a National Programme. Certain publications still list 6135 as being located at Al-Hiswa (Aden), but SW facilities there were bombed and destroyed during the 1994 War of Unity. R. Sana'a has a beautiful QSL card and more DXers would receive it if they would care to report the programmes in English and write to: English Service, Radio Sana'a, P O Box 2371, Sana'a, Rep. of Yemen (Maarten van Delft, Holland, DSWCI World News)

...Until the next, Best of DX and 73 de Glenn!

Broadcast Logs

Gayle Van Horn gayle@webworkz.com

0005 UTC on 6797.6

PERU: Ondas del Rio Mayo. Spanish. Andean music and advertisement, "loteroa de Cajamarca", station ID, SINPO=24322. Additional Peruvians monitored: Radiodifusion Huancabamba 6535.8, 0015; La Voz del Campesino 6956.5, 0020; Radio Madre de Dios 4950.1, 2300; Radio Imperio (presumed) 4389, 2310; Radio Cultural Amauta 4995.6, 2325; Radio Ancash 4992.5, 2335; Radio Horizonte 4992.5, 2335; Radio Horizonte 5019.9, 2340; Radio La Oroya 4904.7, 2345; Radio Cultural 4955, 2350; Radio Chota 4890.2, 2350-2355. (Michael Schnitzer, Hassfurt, Germany)

0124 UTC on 4845

GUATEMALA: Radio Kekchi. Nice Latin vocals and text in Kekchi language. Background music during station IDs to regional promos and commercials. Amazing signal! (Mark Veldhuis, Borne, Netherlands/HCDX)

0230 UTC on 7325

AUSTRIA: Radio Austria Int'l. Vienna waltz tune to ID and report on continuing Mad Cow disease research, to story on northern Italy. (William McGuire, Cheverly, MD) Monitored 1630, on 17865 with report on demonstrations and strikes aimed at government budget cuts. (Bob Fraser, Cohasset, MA)

0400 UTC on 6020

TURKEY: Voice of Turkey. Review of Turkish Press. (Jim Boynton, Newton, MA) Impressions of Turkey-interview with a foreign woman living in the country, 2312 on 9655. (Fraser, MA)

0537 UTC on 4845

MAURITANIA: Radio Mauritanie. Male hosts Arabic music program, best noted on 60 meters. Slight heterodyne noted, monitored at 0545. (Harold Frodge, Midland, HI)

0600 UTC on 11840

ECUADOR: HCJB. Saludos Amigos, // 9745. Religious program, Renewing Your Mind 0800, 11755. (Boynton, MA) Adventures in Odyssey 2000 on 17760 // 21455. (Fraser, MA)

0715 UTC on 7265

GERMANY: SWR, Baden. Usual pop music program hosted by woman, including "canned" announcements. Three time ticks with newscast 0800-0804, canned ID into music program. Good and clear signal, best at tune-in. Germany's **Deutschlandfunk** 6190, 0726-0733 in German. Station ID to time tips, notable slop from Mexico 6185. **Deutschland Radio** 6005, 0738-0748, German programming of children's educational segments. Station ID at 0743 with program continued to bridge. Hosts talk with several IDs into German rock music. (Dave Valko, PA/HCDX/Cumbre) **Deutsche Welle** 15135 at 1937 (Dean Burgess, Manchester, MA) Report on Yasir Arafat 2300 on 9815. (McGuire, MD)

0727 UTC on 7260

VANUATU: Radio Vanuatu. Local languages to English news and ID at 0730. Island music past 0800, fair signal quality. (Roger Chambers, Utica, NY/ODXA)

0752 UTC on 9870

MONACO: Trans World Radio. Program sign-on with music box interval signal. English religious programming to 0920. Parallel 12007 mentioned. (Chambers, NY/ODXA)

0847 UTC on 4915

BRAZIL: Radio Difusora Macapa. Accordian music to local time check. Female announcer's station ID at 0902. Brazil's **Radio Anhanguera** audible 11830, 0910 with Portuguese music and station ID. Weak signal, fair and clear. **Radio Cruizero** 4765, 0943 with pop music, time check with pips at 1000. (Chambers, NY/ODXA)

0912 UTC on 4388.97

PERU: Radio Estereo. Soft campo music, finally got two official IDs during canned promo by announcer at 0913. La Voz Salvacion program at 0930. Signal fairly weak. Peruvians noted: Radio Cora 0939-1000 with light instrumental Latin music. ID and freq quote at 0955. Occasional time checks. Radio Difusion San Francisco Solano 4750.14, 0945-1030. Fast paced DJ with several IDs, and almost impossible to hear! (Dave Valko, PA/Cumbre)

1025 UTC on 6115

COLOMBIA: LV del Llano. Very strong, signal splattering all the way to 6095 up to 6190. (Valko, PA/Cumbre)

1124 UTC on 6233.70

CLANDESTINE: LV de la Resistencia. Tune-in with Latin music, possible vocal march music at 1130. Audio was very weak during canned ID to live announcer's segment. Musical bridge to announcer's talk and instrumental music. Strong signal but modulation low with slight drift. Still audible at tune-out. (Valko, PA/HCDX/Cumbre)

1758 UTC on 11402

ICELAND: Rikisuvarpid. Icelandic talk and text from two announcers. Music voice-overs presuming this was an upcoming newscast promotional. Newscast noted with S2-S5 on USB, audio was fair. (Liangas, GRC/ODXA)

1815 UTC on 13640

MADAGASCAR: Radio Canada Int'l. Canada Today-Quebec premier Lucien Buchard steps down. Radio Netherlands **Madagascar relay** 11655 at 1815. Things Mechanical featuring clock and watch makers. (Fraser, MA)

1823 UTC on 4949.99

ANGOLA: Radio Nacional de Angola. Station ID into Portuguese programming. Musical bridge followed by announcer's chat and mentions of Luanda. SINPO=24333. (Veldhuis, NLD/HCDX)

1830 UTC on 13640

ASCENSION ISLANDS: RTE. Report and interview on a controversy over destroyed medical records, // 21630. (Fraser, MA)

1900 UTC on 11990

KUWAIT: Radio Kuwait. Program feature on Ramadan and its concepts, followed by segment of social programs that give medical services to patients with chronic illnesses. (Burgess, MA)

2007 UTC on 2310

AUSTRALIA: VL8A Alice Springs. Weather reports followed by Aussie country & western music. Morning greetings from announcer. SINPO=24333. (Veldhuis, NLD/HCDX) Aussie VNG Llandilo 16000, 0723-0731. Time pips and voice segments each minute. Complete voice ID at 0730. (Daniel Canonica, Muggio, Switzerland) Radio Australia 9580, 1100. Fair audio for Asia-Pacific segment. (Boynton, MA)

2046 UTC on 4976

UGANDA: Radio Uganda. Pop music and talk in indigenous language. National anthem at 2059, prompt 2100*. Signal poor with deep fading. (Chamber, NY/ODXA)

2048 UTC on 4770

NIGERIA: Voice of Nigeria. Announcer's talk to English newscast at 2100. Station ID with mentions of "Kaduna", followed by a science and technology program. (Chambers, NY/ODXA)

2231 UTC on 4785

BRAZIL: Radio Caiari. Tentative logging for Portugese religious programming. Phone number quote, no ID, signal very low with SIO=121. Tentative logging on Brazil's **Radio Aquidauna** 4795, 2340-0010. Very poor signal quality, too low to discern ID. (Canonica, SUI)

2310 UTC on 9575

MOROCCO: Radio Medi Un. Arabic news covering Middle Eastern topics. Fanfare briefs into martial and regional popular music. Signal strong but noisy, fair quality to good. (Chambers, NY/ODXA) **RTV Marocaine** 15345, 1636-1700+, Arabic music to mentions of "Maroc". French ID at 1700. (Frodge, MI)

2348 UTC on 7120

ITALY: IRRS. Announcer's address and FAX quote, into live version of *Somebody to Love* by Queen. Full ID announcement by man at 2356 including mention of use of omnidirectional north beam with reduced carrier SSB at 10kW PEP. Address, FAX and phone number repeated, signal fair but heavy CW interference from 7125 Guinea. (Valko, PA/HCDX/Cumbre)

SI(NP)O = strength, interference, (noise, propagation), overall

Thanks to our contributors – Have you sent in YOUR logs?

Send to Gayle Van Horn, c/o Monitoring Times (or e-mail gayle@webworkz.com)

English broadcast unless otherwise noted.

The QSL Report

Gayle Van Horn gayle@webworkz.com

Veri Signers: are they worth the trouble?

Let's face it; every QSL collector has his own method of achieving the ultimate goal, nabbing a verification from a radio station. Most collectors will gladly boast of their results in the hobby clubs and magazines, and rightly so; while others consider their windfall a *trade secret*, one to be shared only with the elite.

During a recent phone call with a well known DXer and friend, I was queried on my opinion of the use of addressing reception reports to a specified individual, in particular veri signers. Considering his hobby status, I was perplexed at his question, as well as the revelation that he considers their use, "not worth the trouble."

A *veri signer* is the person that signs the verification on the card or letter. Usually a specific person is designated to answer reception reports, or sometimes the signer may be nonadministrative staff who answer the mail.

Generally, I recommend addressing letters to a veri signer, especially if it is one that has been reported regularly within the hobby.

However, if the veri signer's response has taken over a year, or if it was addressed to an announcer or secretary, I would agree with my DX friend. He's absolutely right. Staff personnel change, and unless you're dealing with the QSL Manager or the Chief Engineer of an AM station, a follow up report may be in your future.

My friend continued, "In several known instances, the secretary or announcer would not answer mail unless instructed by the manager, who incidentally was conspicuously absent most of the time." He might have a point; I suggested that in such cases an alternative could be to address your letter to a particular program or language service. Obviously, broadcasters are interested in their listener's opinions on programming, and addressing a report to a particular one should interest them.

Whether you opt to address your report to a veri signer is a DXer's prerogative. What's your opinion...is it worth the trouble?

CHINA

Radio China Int'l, 9690 kHz. Full data Great Wall scenery card in signed. Received in 30 days for an English report. Station address: 16A Shijingshan Street, Beijing 10040, China. (David Weronka, Benson, NC)

INDONESIA

RRI-Biak, 6154 kHz. Partial data letter signed by Butje Latuperissa-Kepala Seksi Siaran. Received in 19 days for an Indonesian report and one U.S. dollar. Station address:Kotak Pos. 505, Biak, Irian Jaya, Indonesia. (Yamada, Japan/Cumbre DX)

RRI-Jayapura, 6069.8 kHz. No data English letter signed by Hartono-Bidang Teknik. Received in 184 days for an Indonesian report and one U.S. dollar. Station address: Kotak Pos 1077, Jayapura 99222, Irian Jaya, Indonesia. (Yamada, Japan/Cumbre DX)

RRI-Sorong, 4874.5 kHz. No data English letter signed by Muchtar Yushaputra-SH.BA, Head of Station. Received in two months for an Indonesian report and one IRC. Station address: Kotak Pos 146, Sorong 98414, Irian Jaya, Indonesia. (Richard Lam, Singapore/Cumbe DX)

MEDIUM WAVE

88 Country, 1593 kHz AM. Full data letter signed by Honest John Peterson-Chief Engineer/General manager. Received in 17 days for a cassette taped programing. Station address: P.O. Box 1603, Christchurch, New Zealand. QSL # 104 for New Zealand! (Patrick Martin, Seaside, OR)

KEX, 1190 kHz AM. Date/frequency verification letter signed by Brooks Burford-Newscaster, plus four souvenir key chains. Received in 15 days for an AM report and US mint stamp (returned with reply). Station address: 4949 S.W. Macadam Ave., Portland, OR 97201 (Mickey Delmage, Sherwood Park, Alberta, Canada)

KIFO, 1380 kHz AM. Full data QSL letter unsigned, plus program schedule. Received in 45 days for an English AM report. Station address: 738 Kahwka St., Honolulu, HI 96814-3726. (Martin, OR)

KUYL, 1280 kHz AM. Full data verification on station letterhead, signed by Marty Lanser-Asst. Program Director. Received in 47 days for and AM report. Station address: Clear Channel Comm., 3600 Sisk Rd., Modesto, CA 93556 USA. (Martin, OR)

NEW ZEALAND

Radio New Zealand Int'l, 15175 kHz. Full data scenery card verified by Director, plus program schedule. Received in 35 days for an English report. Station address: P.O. Box 123, Wellington, New Zealand. (Weronka, NC)

PAPUA NEW GUINEA

Radio Bougainville, 3325 kHz. Full data prepared QSL card stamped and signed with illegible signature. Received in two months for an English report and one U.S. dollar. Transmitter power listed as 5kW on card. Station address: P.O. Box 35, Buku, North Solomon Province, Papua New Guinea. (George Maroti, NY/Cumbre DX)

Radio Madang, 3260 kHz. Partial data letter signed by George Gedabing-Prov. Program Manager. Received in three months for a cassette tape of programming and an SASE (returned). Station address: P.O. 2138, Madang, Papua New Guinea. (Greg Myers, VA/Cumbre DX)

PIRATE

Ground Zero Radio, 6955 kHz USB. Full data atomic bomb explosion/mushroom cloud photo, signed by Texas Pete, plus advertising for Hobby Broadcasting magazine. Received in 105 days for an English email pirate report. Email address: sgzrsw@usa.net>. Response received from pirate maildrop; P.O. Box 109, Blue Ridge Summit, PA 17214 (Bill Wilkins, Springfield, MO)

Indira Calling, 6955 kHz USB. Full data Indian Musical Instruments sheet signed by Vijay Nehru, plus map of Rhode Island showing Indian city names. Received in 103 days for an English pirate report and three U.S. mint stamps. Pirate maildrop: P.O. Box 28413, Providence, RI 02908. (Wilkins, MO)

KIPM-Illuminati Prima Materia, 6950 kHz USB. Full data 8 x 11 QSL, plus a three page history/description of KIPM with previous show titles. Received in 29 days for an English pirate report and three U.S. mint stamps. Pirate maildrop: P.O. Box 24, Lula, GA 30554. (Kraig Krist, Annandale, VA)

SINGAPORE

RTE/Radio Telefis Eireann relay, 11740 kHz. Full data QSL card unsigned. Received in ten days for an email report to Julie Hayde <haydei@rte.je>. Station address: Dublin 4, Ireland. (Krist, VA)

UNITED STATES

USAF Reserve 403rd Air Force Reserve Wing, 53rd Weather Reconaissance Squadron, 8846, 11342 kHz USB. Partial data USAFAFRES picture postcard, signed by Maj. Fitz (TEAL 66). Received in 37 days for an English report. Station address: USAFRES 53rd WRS, 403rd Wing, 701 Fisher St., Keesler AFB, MS 39534-2572 USA. (Scott Medlin, Cleveland, TN)

Programming Spotlight

John Figliozzi jfiglio1@nycap.rr.com

AFTERNOON DELIGHTS

ack in January, we suggested that breakfast time listening represented a sort of second prime time for the shortwave bands. Since then, a few readers have pointed out (and correctly so) that the afternoons "ain't too shabby" either!

When it's afternoon in North America, it's evening prime time on the other side of the Atlantic. Several stations targeting western Europe also put excellent signals into North America at that time. In fact, some stations – such as *Radio Tirana* and *Radio Romania International* – actually are easier to hear via their broadcasts to Europe, than during our evenings when they are ostensibly *trying* to broadcast to us. Other stations – like *Radio Polonia* and *All India Radio* – which have no transmissions directed specifically to North America, can be heard best during our afternoons as well.

All India Radio

Given the number of Indian expatriates living in the USA and Canada, and the fact that India owns some of the most powerful shortwave transmitters on earth, it's hard to understand why All India Radio (AIR) does not broadcast to North America. Nonetheless, those 500 kW transmitters often put a hefty signal into at least the eastern half of this continent from 1745-2230, even though AIR's General Overseas Service is targeting the UK and Western Europe. 7410 kHz and 11620 kHz have been good performers over the past few months, especially as it gets later. However, since April begins the A01 (spring) seasonal frequency turnover period, you may need to consult MT's Shortwave Guide for an update.

For North Americans, the programming can only be described as exotic. The music, the subcontinental English accent and the focus on south Asia are largely unfamiliar to us. While the AIR schedule is dominated by music – everything from film tunes, which are wildly popular (Indians are some of the most avid cinema-goers in the world) to Karnatak instrumental – there are also ample newscasts, commentaries and magazine shows on topics like development, culture, science, literature and film.

The audio can be "muddy" at times due to poor modulation. However, this problem does not mar the entire schedule, as can be the case with *Radio Cairo*. So sticking with the station does yield a pleasant and interesting listening experience for the most part.

AIR Program Schedule (1745-2230)

1745 M Light Music, T Karnatak Instrumental Music, W Folk Songs, H-S Devotional Music; 1800 D News; 1810 D Commentary; 1815 W Instrumental Music-Old Masters, H-T Hindustani

Classical Vocal Music; 1830 \$ Sports Roundup(1st)/Features(2nd)/Film Story(3rd)/ Discussion(4th), M Faithfully Yours, T Cultural Talk, W Book Review(1st)/Window on Science(2nd/4th)/Times and Lives(3rd), H General Talk, F Focus(1st)/Horizon (2nd/4th)/Music (3rd), A For Youth(1st)/Indian Classics(2nd)/ Archives(3rd)/Quiz Time(4th); 1840 M DXers' Corner(2nd/4th), T Film Songs of Yesteryears, W Hits from Films, H Light Karnatak Music, A Light Instrumental Music; 1850 M Film Songs, F Light Music; 1900 D News; 1905 D Indian Press Review; 1910 \$ Women's World, MWF Radio Newsreel, T Of Persons, Places & Things(1st/3rd)/Our Guest(2nd/4th), H Panorama of Progress, A Mainly for Tourists(1st/3rd)/Indian Cinema(2nd)/ On the Export Front(4th); 1920 SMWF Film Songs, T Light Classical Music, H Light Instrumental Music, A Karnatak Classical Music; 1930 DCommentary; 1935 SHF Indian Film Songs, M Karnatak Vocal Music, T Folk Songs, WA Light Music; 1945 D Talk and Music Programs in Hindi; 2045 D Indian Press Review; 2050 ST Instrumental Music, MF Folk Songs, W Light Music, H Classical Vocal Music, A Regional Devotional Music; 2100 D News; 2105 D Commentary; 2111 S Regional Film Songs, MA Classical Vocal Music, T Karnatak Vocal Music, WH Instrumental Music, F Orchestral Music; 2120 S Sports Round-up(1st)/ Features(2nd)/Film Story(3rd)/Discussion(4th), M Faithfully Yours, T Cultural Talk, W Radio Newsreel, H Panorama of Progress, F Focus(1st)/ Horizon(2nd/4th)/Music (3rd), A For Youth(1st)/ Indian Classics(2nd)/Archives(3rd)/Quiz Time(4th); 2130 M DXers' Corner(2nd/4th), TW Film Songs, H Classical Half Hour, A Old Film Songs; 2140 F Film Songs; 2145 M Film Songs; 2150 S Karnatak Vocal Music; 2200 D News; 2210 D Commentary; 2215 S Women's World, MF Radio Newsreel, T Of Persons, Places & Things(1st/3rd)/Our Guest(2nd/4th), W B o o k Review(1st)/Window on Science(2nd/4th)/Times & Lives(3rd), H General Talk, A Mainly for Tourists(1st/3rd)/Indian Cinema(2nd)/On the Export Front(4th); 2225 D Film Tune.

Radio Polonia

Poland, though closer to us geographically, is much harder to hear on shortwave than *AIR*. That's too bad because the "External Service of Polish Radio Warsaw" (*PRW*) is one of the better international services. Here, again, it seems curious that Poland does not make more of an effort toward this side of the Atlantic given the large Polish community residing here.

It is worth your effort to try and tune in. Now that we are in the A01 season, the afternoon broadcast (evening to western Europe) runs one hour and starts at 1930. Higher frequencies propagate better this time of year, so 9525 kHz is probably your only chance.

Too frustrating an experience? Radio Polonia

also netcasts on-demand from <http://www.wrn.org/on demand> and uses WRN North America to broadcast via satellite and over the Internet at 0300-0330 and 2030-2100. (Further details also from <http://www.radio.com.pl/polonia/>.)

Radio Polonia

Program Schedule (1930-2030) 1930 S News, M-F News from Poland, A Europe East; 1935 S Panorama; 1950 M Cookery Corner, TLetter from Poland, W Day in the Life, H Focus, F Business Week; 2000 S Request Concert, M Best of Polish Radio, T Multimedia Show, W Discovering Chopin, H Soundcheck, F Postbag, A The Weeklies; 2005 A Chart Show.

The West Africans

Many who wax rhapsodic about late afternoon North American listening do so because of the Africans. Since it's after dark in west Africa, several of that continent's tropical band (60 meters – 4700 to 5100 kHz) domestic stations sometimes propagate to North America, especially to eastern portions and especially during our winter. Vibrant music is sought from places like Nigeria (4770 – also 7255 kHz), Mali (4783 and 4835 kHz), Senegal (4890 kHz), Ghana (4915 kHz) and Togo (5047 kHz).

A very popular station heard year-round because of its rare (for Africa) 250 kW transmitters is *Afrique Numero Un*, which broadcasts from Gabon. The reason for its popularity rests with the cornucopia of African popular music it broadcasts daily. The lively DJ introductions and banter in French (some English slips in now and then) enhance the presentation. *Kilimandjaro*, a weekday hit parade program now almost legendary in some quarters, goes out daily for two hours. But there are many other fine music programs, such as *Jazz Anthologie*, *Acadamie de la Musique Africaine*, *Reggafrica and Africa Dance*.

Afrique Numero Un broadcasts during our afternoons on 9580 kHz and from 1700 to 2100 on 15475 kHz. It is also streamed live over the Internet, details from http://www.africal.com/>.

Afrique Numero Un Selected Programs

1610 M-F Kilimandjaro, A Academie de la Musique Africaine; 1810 M-F Africa Song (1 hr.); 1910 A Reggafrica; 2010 A Africa Dance (part 1); 2130 M-F Jazz Anthologie (90 min.), A Africa Dance (part 2).

Remember, times are in UTC, day abbreviations are as used in MT's Shortwave Guide, and programs are always subject to change. Next month, by popular demand, a DX programs list. Until May, good listening!

Shortwave Guide

How to Use the Shortwave Guide

0000-0100 twhfa USA, Voice of America

(1) (2) (5) (3) (4)

5995am 6130ca 7405am 9455a

60

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings) 4, 5, 6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ②, followed by the station name ②. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast Ä will appear in the column following the time of broadcast, using the following codes:

Day Codes

s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column **⑤**, <u>irregular broadcasts</u> are indicated "tent" and programming which includes languages besides English are coded "vl" (<u>various languages</u>).

Choose the most promising frequencies for the time, location and conditions.

The <u>frequencies</u> (a) follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations

and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before publication.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the <u>target area</u> **②** of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af: Africa

al: alternate frequency

(occasional use only)

am: The Americas

as: Asia au: Australia

ca: Central America

do: domestic broadcast eu: Europe

irr: irregular (Costa Rica RFPI)

me: Middle East
na: North America
om: omnidirectional
pa: Pacific
sa: South America

va: various

Choose a program or station you want to hear.

Selected programs appear on the lower half of the page for prime listening hours – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT Monitoring Team

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PROGRAM HIGHLIGHTS

JOHN FIGLIOZZI

Time Change

By the first weekend in April, all local seasonal time changes will have been implemented. This bi-annual event effects changes to many, but not all, international broadcasting schedules. Since few stations give advance indications as to whether and how their schedules will change, we are forced – also due to the exigencies of magazine deadlines – to guess station intentions based on their past behavior. This we have done and hope what is rendered in these pages is an accurate rendition of the results of this spring's exercise in time travel.

No more Waveguide?

Richard Lambley, the host of what has been the BBC World Service's monthly report on international broadcasting, announced at the close of the February installment that March's program was to be the last in the series. As of the deadline date of this month's magazine, there is no other indication of this; nor has there been any announcement of a replacement. March 24 at 0430 was your last chance to hear this program on the Americas stream, although it may be archived as an Internet audio file for a time after that air date.

Dispatches

The *CBC*, seeking to recapture some of the spirit its reporting once had, introduced this program in January hosted by its most experienced foreign correspondent, Rick Mac Inness-Rae. *Dispatches* is also intended to provide a Canadian perspective to international affairs and events. It airs on *Radio Canada International (RCI)* each Wednesday at 2330 UT.

Schedule Changes at Radio Australia

RA, in conjunction with its introduction of new frequencies for Asia from off-shore transmitters, has adjusted its English Service program schedule to provide its flagship programs to its newly shortwave-accessible Asian audience. Most of these changes are centered in the 0000 to 0500 UT period and are fully reflected in this month's listings.

New VOR Programs

The *Voice of Russia* has introduced some new programs, notably *The 20th Century: Footprints in History, Musical Portraits of the 20th Century* and *Music Around Us.* Check the listings for air times.

Frequencies .

0000 00		Cambodia, National Radio Of Japan, Radio	11940as 17810as	13650as			0000	0100 0100	as	UK, Global Kitchen/Merlin UK, Global Kitchen/Merlin	3955eu 6170eu	6180eu	7165eu	
0000 00	30	Egypt, Radio Cairo Thailand, Radio	9900am 9680va	1303003				0100	1	Ukraine, R Ukraine International		9610na	9385na	9810na
0000 00	030		3915as 7105as 11955as 17790as	5965as 9410me 12095sa	5975na 9590am 15280as	6175na 9915sa 15360as		0100		USA, Armed Forces Radio 6350va 12579va USA, KAIJ Dallas TX	4278va 6458va 12689va 5755va	4319va 6847va 13362va	4993va 10320va 16847va	5765va 10940va
0000 00 0000 00		India, All India Radio North Korea, Voice of Korea 15180na	9705as 4405va	9950as 11460na	11620as 11710na	13605as 13760na	0000	0100 0100		USA, KTBN Salt Lake City UT USA, KWHR Naalehu HI	7510na 17510as	6130ca	7405am	9455ca
0000 00 0000 01			5960am 6090am	9755am				0100	twhfa	USA, Voice of America 9775am USA, WBCQ Monticello ME	5995am 11695ca 7415na	13740am 9335na	/4U3am	9455C0
0000 01 0000 01 0000 01	00 vl 00 vl	Australia, ABC/Alice Springs Australia, ABC/Katherine Australia, ABC/Tennant Creek	4835do 5025do 4910do				0000 0000	0100 0100 0100		USA, WEWN Birmingham AL USA, WHRA Greenbush ME USA, WHRI Noblesville IN	5825va 7580na 7315sa	7425na	9355na	
0000 01 0000 01		Australia, Christian Voice Australia, Radio 17750as	9875va 9660pa 17795va	15165va 12080pa 21740va		21680va 17580va		0100 0100 0100		USA, WINB Red Lion PA USA, WJCR Upton KY USA, WRMI Miami FL	12160am 7490va 9955am	13595as		
0000 01 0000 01 0000 01	00	Canada, CBC Northern Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB	9625do 6070do 6030do				0000	0100 0100 0100	sm	USA, WSHB Cypress Crk SC USA, WTJC Newport NC USA, WWBS Macon GA	9430am 9370na 11900eu			
0000 01 0000 01	00 00	Canada, CHNX Halifax, NS Canada, CKZN St John's NF	6130do 6160do				0000 0000	0100 0100		USA, WWCR Nashville TN USA, WWFV McCaysville GA	3215am 5085va	5070am 6890am		7435am
0000 010 0000 010 0000 010	00 00	Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl Costa Rica, University Network Ecuador, HCJB	6160do 7450va 7490va 9745na	15048va 15048va 11840na	15065va 15065va 21455usb	21815usb	0000 0000	0100 0100 0100 0100	vl	USA, WYFR Okeechobee FL Vanuatu, Radio Zambia, Christian Voice Armenia, Trans World Radio	6085na 3945do 4965do 6240me	9505na 4960do	15060as 7260do	
0000 01 0000 01	00	Guyana, Voice of	11690va 3289do	11720va 5949do			0030	0100 0100		Iran, VOIRI Sri Lanka, Sri Lanka BC Corp	6065am 4940do	6135na 9770eu	6150na	9022na
0000 01 0000 01 0000 01	00	Japan, Radio Liberia, Voice of Hope	6145na 6280af 7295do					0100		Sri Lanka, Sri Lanka BC Corp 15425as	4940do 13695na	6005as	6075as	9770as
0000 01 0000 01	00	Malaysia, Radio Malaysia, RTM Kota Kinabalu Malaysia, RTM Sarawak Namibia, Namibian BC Corp	5980do 7160do 3270af	3289af				0100		Thailand, Radio UK, BBC World Service 7105as 12095sa	5965as 9410me 15280as	5975na 9590am 15360as	6175na 9915sa 17790as	6195as 11955as
0000 01 0000 01	00 00	Netherlands, Radio New Zealand, R New Zealand Int	6165na	9845na			0030	0100		USA, VOA Special English	7215as 17740as	9890as 17820as		15185as
0000 01 0000 01	00 vl	New Zealand, ZLXA Papua New Guinea, NBC	3935do 9675do	7290do 11880do				0100			7215as 17740as	9890as 17820as	11760as	15185as
0000 01 0000 01 0000 01 0000 01	00 vl/as 00 vl/a	Singapore R Corp of Singapore Solomon Islands, SIBC Solomon Islands, SIBC Spain, R Exterior Espana	6150do 5020do 9545do 6055na				0050	0100 0100 0100	vl	Pakistan, Radio Italy, RAI International UK, International BC Tamil	9780as 6010na 11570as	11650as 9675na	15455as 11800na	

SELECTED PROGRAMS

0000 S Did You Hear?, M Hour of Decision, T-A Insight for Living; 0028 T-A Money Minute; 0030 S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; 0056 A Slice of Infinity.

Radio Australia

0000 D News, 0005 S The Europeans, A Feedback (letters/station news), 0010 M AWAYEI (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history); 0030 A In Conversation-Rural.

Radio Netherlands

0000 S Sound Fountain (soundscapes), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Encore (best of RN), A A Good Life (global development): 0030 S Roughly Speaking (youth culture), M Sound Fountain, Tu EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

Radio New Zealand International

0000 S/A RNZ News; M-F Midday Report; 0012 S This Week in Parliament, A Focus on Politics; 0033 S Spectrum (life in NZ), A The Sampler (latest CDs).

Radio Prague

0000 D News; 0005 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0010 S Saturday Music (classical/folk/jazz), M From the Weeklies; 0015 M The Arts, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Mailbox; 0020 W Talking Point, F Economic Report.

Spanish Foreign Radio

0000 S Visitors' Book, M Window on Spain, T-A News; 0015 S American Chronicles, M Entremeses (food/tourism); 0028 M Music series; T-A Spanish Pop Music; 0032 S Spain in the American West; T-A Press Review; 0035 T Entertainment in Spain, W Kaleidoscope (life in Spain), H As Others See Us, F Africa Today, A Radio Club (letters); 0047 S Radio Waves, M Radio Club (repear), T-A Spanish Language Course; 0057 Program Info.

Voice of America (News Now)

0000 T-A World News; 0010 T-A Regional News; 0014 T-A USA News; 0018 T-A Sports; 0022 T-A Features; 0030 T-A World News; 0033 A Press Conference USA; 0045 T-F Science; 0049 T-F Business; 0053 T-F Music feature.

WBCQ, Maine

7415 kHz.: 0000 S A Different Kind of Oldies Show, M Radio New York International, H

ldio-Audio, F Radio Detective (antique radio), A Allan Weiner Worldwide. 9335 kHz.: 0000 S Pagan Poupourri.

WHRI. Indiana

7580 kHz.: **0000** A 20 The Countdown Magazine (from F 2300).

WWCR, Tennesee

5070 kHz.: **0030** F Ken's Country Classics.

YLE Radio Finland

0030 S Capital Cafe (conversations); 0054 S Nuntii Latini (news in classical Latin).





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April 2001

Shortwave Guide

0100 0110 0100 0115 0100 0125 0100 0127	Italy, RAI International Pakistan, Radio Netherlands, Radio Czech Rep, Radio Prague Intl	6010na 9780as 6165na 6200na	9675na 11650as 9845na 7345na	11800na 15455as		0100 0100 0100	0200 0200 0200	vl	New Zealand, ZLXA Papua New Guinea, NBC Russia, Voice of Russia WS 13666na	3935do 9675do 7125na 15470na	7290do 11880do 7180na	12010na	12020na
0100 0127 0100 0127 0100 0130 s 0100 0130 0100 0130	Iran, VOIRI Vietnam, Voice of Germany, Universal Life Hungary, Radio Budapest Slovakia, R Slovakia Internationa	6065am 9525na 9435as 9835na	6135na 7230ca	6150na 9440sa	9022na	0100 0100 0100 0100 0100	0200 0200 0200 0200 0200	vl/as vl/a	Singapore R Corp of Singapore Soloman Islands, SIBC Soloman Islands, SIBC Spain, R Exterior Espana Sri Lanka, Sri Lanka BC Corp	6150do 5020do 9545do 6055na 4940do	6005as	6075as	9770as
0100 0130	USA, Voice of America 11705as 17820as	7115as	7200as 15250as	7200as 15300as	9850as 17740as	0100	0200 0200 0200		15425as Switzerland, Swiss R Internationa UK, BBC World Service		5975na	6175na	6195as
0100 0130	Uzbekistan, Radio Tashkent 9540as	5955as	5975as	7105as	7215as	0.00	0200		9410me 15280as	9590am 15310as	9915sa 15360as	11955as 17790as	12095sa
0100 0145	Germany, Deutsche Welle 9765na	6040am 12040na	6145na	9640am	9700na	0100 0100	0200 0200	as	UK, Global Kitchen/Merlin USA, Armed Forces Radio	3955eu 4278va	6180eu 4319va	7165eu 4993va	5765va
0100 0156 0100 0156 0100 0200 0100 0200 vl 0100 0200 vl	China, China Radio Internationa North Korea, Voice of Korea Anguilla, Caribbean Beacon Australia, ABC/Katherine	3560va 6090am 5025do 4910do	11735va	15229va	17734va	0100 0100 0100	0200 0200 0200		6350va 12579va USA, KAIJ Dallas TX USA, KTBN Salt Lake City UT USA, KWHR Naalehu HI	6458va 12689va 5755va 7510na 17510as	6847va 13362va	10320va 16847va	10940va
0100 0200 VI 0100 0200 0100 0200	Australia, ABC/Tennant Creek Australia, Christian Voice Australia, Radio 17580va	9875va 9660pa	15165va 12080pa 17795va	17645va 15240as 21725va	21680va 15415as	0100	0200	twhfa	USA, Voice of America 9775am USA, WBCQ Monticello ME		6130ca 9335na	7405am	9455ca
0100 0200 0100 0200 0100 0200 0100 0200	Canada, CBC Northern Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB Canada, CHNX Halifax, NS	9625do 6070do 6030do 6130do	17773V0	21/2Jvu		0100 0100 0100 0100	0200 0200 0200 0200		USA, WHOM Birmingham AL USA, WHRA Greenbush ME USA, WHRI Noblesville IN USA, WINB Red Lion PA	5825na 7580na 7315sa 12160am	7425na	9355na	
0100 0200 0100 0200 0100 0200 0100 0200	Canada, CKZN St John's NF Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl Costa Rica, University Network	6160do 6160do 7450va 7480va	15048va 15048va		21815usb	0100 0100 0100 0100	0200 0200 0200 0200		USA, WJCR Upton KY USA, WRMI Miami FL USA, WSHB Cypress Crk SC USA, WTJC Newport NC	7490va 9955am 9430na 9370na	13595as		
0100 0200 0100 0200 0100 0200 a/monthly	Cuba, Radio Havana Ecuador, HCJB Finland, Scandv Weekend Radio	6000na 9745na 11690va	9820na 11840na 11720va	11705na 21455usb		0100 0100 0100	0200 0200 0200	sm	USA, WWBS Macon GA USA, WWCR Nashville TN USA, WWFV McCaysville GA	11900eu 3215am 5085va	5070am 6890am	5935am	7435am
0100 0200 0100 0200 0100 0200	Germany, Voice of Hope Guyana, Voice of	6185na 3289do	5949do	15140		0100	0200 0200 0200	vl	USA, WYFR Okeechobee FL Vanuatu, Radio	6065na 3945do	9505as 4960do	15060as 7260do	
0100 0200 0100 0200 0100 0200	Indonesia, Voice of Iraq, Radio Iraq International Japan, Radio 17835sa	9525va 9684va 9515va 17845as	11785va 11785va 11860as	15149va 11870va	15325as	0100 0130 0130 0130	0145 0159 0200		Zambia, Christian Voice Libya, Voice of Africa Finland, YLE/R Finland Lithuania, Radio Vilnius	4965do 11815af 9655na 6120na	17725af 12035na		
0100 0200 0100 0200	Liberia, Voice of Hope Malaysia, Radio	6280af 7295do				0130 0130	0200 0200		Sweden, Radio UK, RTE Radio	7290as 6155ca	9495as		
0100 0200 0100 0200 0100 0200	Malaysia, RTM Kota Kinabalu Namibia, Namibian BC Corp New Zealand, R New Zealand In	5980do 3270af t 17675pa	3289af			0130 0130 0140	0200 0200 0200	twhfa twhfa	USA, VOA Special English USA, Voice of America Vatican City, Vatican Radio	7405am 5995am 7335au	9775am 6130ca 9650au	13740am 9455ca	

SELECTED PROGRAMS

BBC World Service (am)

0100 S/M The World Today, T-A News; Oi 05 M Wright Around the World (musical variety), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Discovery (science); Oi 30 S Reporting Religion, T Everywoman, W Focus on Faith, H Pick of the World (BBC's best), F People & Places, A Essential Guide; Oi 45 S Letter from America (Alistoir Cooke comments).

China Radio International

0100 D News; 0110 S Report on Developing Countries, M-F Current Affairs, A Global Review, 0120 S In the Spotlight (cultrual magazine), A Listeners' Garden; 0130 M People in the Know (China's leading citizens), T Sports World, W China Horizons (business), H Voices from Other Lands, E Life in China.

Deutsche Welle

0100 D News; 0105 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current offairs); 0115 S Inside Europe, M Arts on the Air; 0130 T Insight (international affairs), W Man & Environment, H Living in Germany, F Spotlight on Sport, A German by Rodio.

HCJB, Ecuador

0100 D Latin American & World News; 0110 S DX Partyline, M Musical Mailbag, T-A Studio 9 (Latin American regional report); 0130 T Inside HCIB, W Saludos Amigos, H Ham Radio Today, F Woman to Woman, A Musica del Ecuador.

Radio Australia

0100 D News; 0105 S Correspondents' Report, A Asia Pacific (regional current affairs); 0110 M-F Asia Pacific; 0130 S Oz Sounds (Australian music), M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A Arts Talk. [Special service: 0105 A Grandstand (live sports action) on 9660, 12080, 17580, 17715, 17750, 21725 kHz, only.]

Radio Budapest

O100 D News; O110 S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Canada International

0100 D News; 0108 S Canada Newsweek, M Maple Leaf Mailbag, T-S Canada Today (current events magazine); 0130 S Canada Review (business/tech edition), M Canada Review (arts edition).

Radio Habana Cuba

0100 M Weekly Review, T-S International News; 0110 T-S National News; 0115 T-S View-point; 0130 M Mailbag Show, T-S News Bulletin; 0135 T-A Time Out (sports); 0140 S/W DXers Unlimited, M/F Caribbean Outlook, H Mailbag Show, A Weekly Review.

Radio Japan

0100 D News; 0110 S Roundup Asia, M Hello from Tokyo (listener contact); 0115 T-A 44 Minutes (feature magazine).

Radio Netherlands

0100 S/M News, T-A Newsline; 0105 S Europe Unzipped, M Wide Angle (week in review).

Radio New Zealand International

0100 D RNZ News; 0106 S Books at One, M-F Cadenza (light classics), A Home Grown (NZ music, including Musical Chairs-artist feature 0030); 0130 S Future Indicative (for disabled).

Radio Prague

0100 D News; 0105 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0110 S Saturday Music (classical/folk/paz), M From the Weeklies; 0115 M The Arts, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Mailbox; 0120 W Talking Point, F Economic Report.

Spanish Foreign Radio

0100 S Visitors' Book, M Window on Spain, T-A News; 0115 S American Chronicles, M Entremeses (food/tourism); 0128 M Music series; T-A Spanish Pop Music; 0132 S Spain in the American West; T-A Press Review, 0135 T Entertainment in Spain, W Kaleidoscope (life in Spain), H As Others See Us, F Africa Todgy, A Radio Club (letters); 0147 S Radio Waves, M Radio Club (repeat), T-A Spanish Language Course.

Swiss Radio International

0100 D Newsnet (Swiss magazine); 0110 S Name Game (Swiss geography quiz-1st week) or Capital Letters (Znd/4th) or Sounds Good (Swiss music-3td/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3trl); 0115 H Book Zone (Znd only), A Business Spotlight; 0130 D Newsnet (Swiss magazine); 0140 S Name Game (Swiss geography quiz-1st week) or Capital Letters (Znd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0145 H Book Zone (Znd only), A Business Spotlight.

Voice of America (News Now)

0100 T-A World News; 0110 T-A Regional News; 0114 T-A USA News; 0118 T-A Sports; 0122 T-A Features; 0130 T-A World News; 0133 A Communications World; 0136 T-F Dateline (news magazine); 0145 T-F Science; 0149 T-F Business; 0154 T-F Feature.

Voice of Russia

0100 D News; 0111 S News & Views, M Sunday Panorama, T-A Commonwealth Update; 0124 M Russia in Personalities; 0130 D News in Brief; 0132 S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits of the 20th Century, F Music Around Us, A Christian Message from Moscow; 0146 F Music At Your Request; 0154 H Russia: People & Events.

Voice of Vietnam

0100 D News, 0105 D Current Affairs, 0110 Su Weekly Review, M Sunday Show, T/W/F/ A Press Review, H Talk of the Week; 0115 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0120 S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: **0100** S Marion's Attic (vintage recordings). 9335 kHz.: **0100** S Bedtime Revelation Stories.

WHRI, Indiana

7315 kHz.: 0105 M Music (Christian contemporary and gospel)

WWCR, Tennessee

3215 kHz.: **0105** T-A Golden Age of Radio Theatre. 5070 kHz.: **0130** A New Horizons (science); **0145** S Ask WWCR (letters).

Radio Austria International

0130 D Report from Austria (magazine); 0135 S Week in Review, M Radio E; 0150 S Listener Letters.

RTE. Ireland

0130 S/M Sportsnews; T-A The News at Six.

Voice of America (Special English)

0130 T-A News; 0140 T Agriculture Today, W/H Science Report, F Environment Report, A In the News; 0145 T Science in the News, W Explorations, H Making of a Nation, F American Mosaic; A American Stories.

Frequencies .

0200 0200 0200	0210 0215 0227	vl	Bangladesh, Bangla Betar Libya, Voice of Africa Czech Rep, Radio Prague Intl	4882as 17725af 6200na	7345na			0200 0200 0200	0300 0300 0300	vl/a	Solomon Islands, SIBC South Korea, R Korea Intl Sri Lanka, Sri Lanka BC Corp	9545do 7275na 6005as	11725sa 6075as	11810sa 6130do	15575na 9770as
0200	0230	sm w fa	Belarus, R Belarus International	5970eu	7210eu			0200	0300			15425as	007303	013000	777003
0200	0230	r	Myanmar, Radio	7185do				0200	0300		Taiwan, R Taiwan International	5950na	9680na		11825pa
0200 0200	0240 0245	T	UK, Global Kitchen/Merlin Germany, Deutsche Welle	6170eu 7285as	9615as	9765as	11965as	0200	0300		UK, BBC World Service	5975na 9770af	6135am 9915sa	6175na 11760me	9410me 11955as
0200	0256		North Korea, Voice of Korea	11845va	13650va							12095sa	15280as	15310as	15360as
0200	0256		Romania, R Romania Internationa		9690as	11830na	11740as	0000	0300		LICA A LE D.I.	17790as	4210	4000	F7/F
0200	0259		Canada, R Canada International		15370pa 9755am	11725am	11990am	0200	0300		USA, Armed Forces Radio	4278va 6350va	4319va 6458va	4993va 6847va	5765va 10320va
				15260as	17860as		,,					10940va	12579va	12689va	13362va
0200 0200	0300	twhfa	Anguilla, Caribbean Beacon	6090am 11710am				0200	0300		USA, KAIJ Dallas TX	16847va 5755va			
0200	0300		Argentina, RAE Australia, ABC/Alice Springs	4835do				0200	0300		USA, KAIS Dallas IX USA, KJES Vado NM	7555na			
0200	0300		Australia, ABC/Katherine	5025do				0200	0300		USA, KTBN Salt Lake City UT	7510na			
0200 0200	0300	vl	Australia, ABC/Tennant Creek Australia, Christian Voice	4910do 9865va	15185va	17645va	21680va	0200 0200	0300		USA, KWHR Naalehu HI USA, Voice of America	17510as 7115as	7200as	9850as	11705as
0200	0300		Australia, Radio	9660pa	12080pa	15240as	15415as	0200	0300		USA, VOICE OF AMERICA	11820as	15250as	15300as	17740as
				15515va	17580va	17750as						17820as			
0200 0200	0300		Bulgaria, Radio Canada, CBC Northern Service	7400na 9625do	9400na			0200 0200	0300		USA, WBCQ Monticello ME USA, WEWN Birmingham AL	7415na 5825va	9335na 7425na		
0200	0300		Canada, CFRX Toronto ON	6070do				0200	0300		USA, WHRA Greenbush ME	7580na	7423110		
0200	0300		Canada, CFVP Calgary AB	6030do				0200	0300		USA, WHRI Noblesville IN	7315sa			
0200 0200	0300		Canada, CHNX Halifax, NS Canada, CKZN St John's NF	6130do 6160do				0200 0200	0300		USA, WINB Red Lion PA USA, WJCR Upton KY	12160am 7490va	13595as		
0200	0300		Canada, CKZU Vancouver BC	6160do				0200	0300		USA, WRMI Miami FL	7385am	1337308		
0200	0300		Costa Rica, R for Peace Intl	7450va	15048va			0200	0300		USA, WSHB Cypress Crk SC	9430na	7535na		
0200	0300		Costa Rica, University Network	5920al 21815irr	6970va	7480va	15048va	0200 0200	0300		USA, WTJC Newport NC USA, WWCR Nashville TN	9370na 3215am	5070am	5935am	7435am
0200	0300		Cuba, Radio Havana	6000na	9820na	11705na		0200	0300		USA, WWFV McCaysville GA	3270va	5085am	3733uiii	/433uiii
0200	0300		Ecuador, HCJB	9745na	11840na	21455usb		0200	0300		USA, WYFR Okeechobee FL	6065na	9505na		
0200 0200	0300	a/monthly	Egypt, Radio Cairo Finland, Scandv Weekend Radio	9475am	11720va			0200 0200	0300	vl	Vanuatu, Radio Zambia, Christian Voice	3945do 4965do	4960do	7260do	
0200	0300	u/mommy	Germany, Voice of Hope	6185na	1172040			0200	1215		Cambodia, National Radio Of	11940as			
0200	0300		Guyana, Voice of	3289do	5949do			0215	0220		Nepal, Radio	5005as	7165as		
0200 0200	0300		Kenya, Kenya BC Corp Liberia, Voice of Hope	4935do 6280af				0230 0230	0257 0300		Vietnam, Voice of Austria, R Austria International	9525na 7325na			
0200	0300		Malaysia, Radio	7295do				0230	0300		Hungary, Radio Budapest	9835na			
0200	0300		Malaysia, RTM Kota Kinabalu	5980do	1 0000			0230	0300		Slovakia, Adventist World Radio	7235as	0.405	05/0	
0200 0200	0300		Namibia, Namibian BC Corp New Zealand, R New Zealand Int	3270af 17675na	3289af			0230 0230	0300		Sweden, Radio Switzerland, Swiss R International	7155alt 9885am	9495am 9905am	9560am	
0200	0300		New Zealand, ZLXA	3935do	7290do			0245	0300		Albania, R Tirana International	6115na	7160na		
0200	0300	vl	Papua New Guinea, NBC	9675do	11880do	12/55	15470	0250	0300	I	Vatican City, Vatican Radio	7305am 6165do	9605am		
0200 0200	0300		Russia, Voice of Russia WS Singapore R Corp of Singapore	7180na 6150do	12020na	13655na	134/000	0250 0257	0300		Zambia, National BC Corp Malawi, Malawi BC Corp	3380do	6265do		
0200	0300	vl/as	Solomon Islands, SIBC	5020do											

SELECTED PROGRAMS

BBC World Service (am)

0200 D World Briefing; 0220 D Sports Roundup; 0230 S From Our Own Correspondent, M Assignment, T-A World Business Report; 0245 T/W/F/A Analysis, H From Our Own Correspondent:

HCJB, Ecuador

0200 S Ham Radio Today, M Sunday Nite, T Let My People Think, W The Book & the Spade (archaeology), H Adventures in Odyssey (Christian stories for children), F Viewpoint (issues), A Walkin' in the Sunshine (country music); 0215 W Words for Women; 0230 S Inside HCIB, T-A Leading the Way.

Radio Australia

O200 D News; O205 S Margaret Throsby (interviews and music), A Ockham's Razor (a science issue); O210 The World Today (ABC Radio flagship news program); O230
A Earthbeat (ecology). [Special service: O205 S/A Grandstand (live sports action) on 9660, 12080, 17580, 17715, 17750, 21725 kHz. only.]

Radio Habana Cuba

0200 M Top Tens, T-S International News, 0210 S The World of Stamps, T-A Spotlight on the Americas, 0230 M The Jazz Place, T-S News Bulletin; 0235 T-S Reports and music.

Radio Korea International

0200 D News; 0210 S Seoul Report (week in review), M Korean Pop Interactive (requests), T-A News Commentan; 0215 T-A Seoul Calling (magazine); 0230 S From Us to You (letters), M Multiwave Feedback (letters/DX news), T Exploring the New Millennium, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (Intalitional music).

Radio New Zealand International

0200 D RNZ News; 0205 S Eureka! (science)*, M-F In Touch with New Zealand (music/variety), A Home Grown (cont'd. from 0106)*; 0230 S Feature program or series*. [*may be preempted by live sport].

Radio Taipei International

0200 D News; 0215 S Great Wall Forum (discussing the mainland), M Jade Bells & Bomboo Pipes (traditional music), T People, W Taiwan Today, H Journey into Chinese Culture, F Taipei Magazine, A Kaleidoscope (life in Taiwan); 0230 S Food, Poetry and Others (culture), T Trends (society), W Stage & Screen, H Hot Spots (nightlife), F East Meets West (visitors), A Reflections (literature); 0245 S Mailbag Time, M-A Let's Learn Chinese.

Voice of Russia

0200 D News; 0211 S/M/H Moscow Mailbag, T/F Science & Engineering, M/A Newmarket (business); 0230 D News in Brief, 0232 S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits of the 20th Century, H Moscow Yesterday & Today, F. Russian by Radio, A Audio Book Club (Russian lit.); 0246 S You Write to Moscow; 0254 Russia: People & Events.

WBCQ, Maine

7415 kHz.: **0200** S Magic Radio. 9335 kHz.: **0200** S World of Radio.

WHRI, Indiana

7315 kHz.: 0205 M-A Music (Christian contemporary and gospel).

Radio Budapest

0230 D News; 0240 S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Sweden

0230 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Mordic (rock music-exc. 1st), T-A Saiv Degrees North (regional report), 0245 T Sports Scan, W Media Scan (1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Swiss Radio International

0230 D Newsnet (Swiss magazine); 0240 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (Includes Postcards from Switzerland-1st & Book Zone-3rd); 0245 H Book Zone (2nd only), A Business Spotlight.

Voice of Vietnam

0230 D News, 0235 D Current Affairs, 0240 Su Weekly Review, M Sunday Show, T/W/F/ A Press Review, H Talk of the Week, 0245 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0250 S Music, A Literature and Arts.

WWCR, Tennessee

3215 kHz.: **0230** A World of Radio.

5070 kHz.: 0200 S Communications World; 0230 S World of Radio.



Shortwave Guide

Frequencies

0300 0310 mtwhf Greece, Voice of Vatican City, Vatica City City City City City City City City	Africa 9525af randeren Intl 11985am	7475eu	12105na	0300 0300 0300	0400 0400 0400	vl/as vl/a	Singapore R Corp of Singapore Solomon Islands, SIBC Solomon Islands, SIBC	13665na 17595na 6150do 5020do 9545do	15445na	15470na	15595na
0300 0330 stwhfa Mexico, R Mexico I 0300 0330 S Africa, Adventist	International 9705am 11770am	n		0300	0400	VI/ a	Sri Lanka, Sri Lanka BC Corp	6005as 15425as	6075as	6130do	9770as
0300 0330 Thailand, Radio 0300 0330 a UK, Wales Radio Ir	15460na ntl/Merlin 9735na			0300 0300	0400 0400		Taiwan, R Taiwan International Turkey, Voice of	5950na 6020as	9680na 7240as	11740as 9655as	11825as 21715as
0300 0330 USA, KJES Vado N 0300 0330 mtwhf USA, Voice of Ame	erica 4960af			0300	0400 0400		Uganda, Radio UK, BBC World Service	4976do 3255af	5026do 5975na	6005af	6135am
0300 0345 Germany, Deutsch	11750na	9640na	9700na					6175na 9410eu	6190af 11730af	6195eu 11760me	
0300 0345 vl Libya, Voice of Afri 0300 0356 China China Radic 0300 0400 Anguilla, Caribbea	International 9690na							11955me 15360as 21660as	15420af	15280as 17760as	15310as 17790as
0300 0400 vl Australia, ABC/Alia 0300 0400 vl Australia, ABC/Kat	ce Springs 4835do			0300 0300	0400 0400		Ukraine, R Ukraine International USA, Armed Forces Radio	9385na 4278va	9810na 4319va	9835na 4993va	5765va
0300 0400 vl Australia, ABC/Ten 0300 0400 Australia, Christian	nnant Creek 4910do n Voice 9865va 15185va		21680va				,	6350va 10940va	6458va 12579va	6847va 12689va	10320va 13362va
0300 0400 Australia, Radio	9660pa 12080pa 15515va 17580va		15415as 21725va	0300	0400		USA, KAIJ Dallas TX	16847va 5755va			
0300 0400 mtwhf Bhutan, Bhutan BC 0300 0400 vl Botswana, Radio 0300 0400 Canada, CBC Nor	3356do 4820do	7255do		0300 0300 0300	0400 0400 0400		USA, KTBN Salt Lake City UT USA, KWHR Naalehu HI USA, Voice of America	7510na 17510as 6035af	6080af	7105af	7290af
0300 0400 Canada, CFRX Tor 0300 0400 Canada, CFVP Cal	onto ON 6070do			0300	0400		USA, WBCQ Monticello ME	7340af 7415na	7415af 9335na	9575af	9885af
0300 0400 Canada, CHNX Ho 0300 0400 Canada, CKZN St	John's NF 6160do			0300	0400		USA, WEWN Birmingham AL USA, WHRA Greenbush ME	5825va 7580na	7425na		
0300 0400 Canada, CKZU Va 0300 0400 Costa Rica, Faro d 0300 0400 Costa Rica, R for P	el Caribe 5054ca 6175ca	9644ca		0300 0300 0300	0400 0400 0400		USA, WHRI Noblesville IN USA, WINB, Red Lion PA USA, WJCR Upton KY	7315sa 12160am 7490va	13595as		
0300 0400 Costa Rica, Univer		7480va	15048va	0300	0400 0400 0400		USA, WRMI Miami FL USA, WSHB Cypress Crk SC	7385am 7535eu	1337308		
0300 0400 Cuba, Radio Havai 0300 0400 Ecuador, HCJB	na 6000na 9820na 9745na 11840na			0300 0300	0400 0400		USA, WTJC Newport NC USA, WWCR Nashville TN	9370na 3215am	5070am	5935am	7435am
0300 0400 Germany, Voice of				0300	0400		USA, WWFV McCaysville GA USA, WYFR Okeechobee FL	3270va 6065na	5085am 9505na	70/01	
0300 0400 vl Guatemala, Radio 0300 0400 Guyana, Voice of 0300 0400 sm Honduras, Radio L	3289do 5949do			0300 0300 0300	0400 0400 0400		Vanuatu, Radio Zambia, Christian Voice Zambia, National BC Corp	3945do 6065do 6165do	4960do 6265do	7260do	
0300 0400 Japan, Radio 0300 0400 Kenya, Kenya BC C	17825ca 21610pa	ı		0300 0310	0400 0315		Zimbabwe, Zimbabwe BC Corp Vatican City, Vatican Radio	4828do 7305am	6045do 9605am	9660af	
0300 0400 vl Lesotho, Radio 0300 0400 Liberia, Voice of H				0315 0330	0340 0357		Vatican City, Vatican Radio Vietnam, Voice of	9660af 9795na			
0300 0400 Malaysia, Radio 0300 0400 Malaysia, Voice of 0300 0400 Namibia, Namibia		15295as		0330 0330 0330	0400 0400 0400		Albania, R Tirana International Myanmar, Radio Sweden, Radio	6115na 9730do 9495na	7160na		
	ew Zealand Int 17675pa			0330 0345	0400 0400 0400	f	UAE, Radio Dubai Seychelles, FEBA Radio	12005na 11885af	13675na	15395na	15400na
0300 0400 vl Papua New Guinea 0300 0400 Russia, Voice of Ru	a, NBC 9675do 11880do		12020na	0345 0357	0400 0400		Uzbekistan, Radio Tashkent Malawi, Malawi BC Corp	7245as 5995do			

SELECTED PROGRAMS

BBC World Service (am)

0300 S/M World Briefing; 0305 T Omnibus (documentary), W The Alternative (music), H Greenfield Collection (classical music), F Jazzmatazz, A Panel game or Quiz; 0320 S/M Sports Roundup; 0330 S Science in Action, M Westway Omnibus (drams serial), T Body & Mind (health), W Patterns of Faith, H Ploin English, F Heant & Soull (religion), A Write On (lettes); 0345 T-A Off the Shelf (book readings).

Channel Africa

0300 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0300 D News, 0310 S Report on Developing Countries, M-F Current Affairs, A Global Review, 0320 S In the Spotlight (cultural magazine), A Listeners' Garden; 0330 M People in the Know (Chino's leading citizens), I Sports World, W China Horizons (business), H Voices from Other Lands, E Life in China.

Deutsche Welle

0300 D News; 0305 S Saturday Review, M Sunday Review, T-A Newslink (European current affairs); 0315 S Spectrum (sai/lech), M Arts on the Air; 0330 T Insight (international affairs), W Man & Environment, H Living in Germany, F Spotlight on Sport, A Germann by Radio.

HCJB, Ecuador

0300 S Rock Solid, M The Sower, T-A Hope for the Heart; 0313 T-A Getting the Message; 0315 M The Word Today, T-A Rendezvous (inspirational music); 0330 M Renewing Your Mind, T Unshackled (radio's oldest drama series), W Science, Scripture and Solvation, The Living Word, F Otrachimow, A Inspirational Classics (liturgical music); 0345 W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

Radio Australia

0300 D News; 0305 S Feedback (letters/station news), A Rural Reporter; 0310 M-F Regional Sports Report; 0320 M-F Pacific Focus (M business, T health, W environment, H sport, F culture); **0330** S Okham's Razor (a science issue), A Educational series; **0340** M Oz Music Show (rodk), T/F Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal), H Australian Country Style. [Special service: **030**5 S/A Grandstand (live sports action) on 9660, 12080, 17580, 17715, 17750, 21725 kHz. and v 1 Style Style

Radio Habana Cuba

0300 M Breakthrough (science), T-S International News; 0310 T-S National News; 0315 T-S Viewpoint; 0330 M From Havana (Luban music), T-S News Bulletin; 0335 T-A Time Out (sports); 0340 S/W DXers Unlimited, M/F Caribbean Outlook, H Mailbag Show, A Weekly Review.

Radio New Zealand International

0300 S/A RNZ News*, M-F Pacific Regional News; 0305 S Playhouse (radio theatre)*, A World of Music (BBC)*; 0308 M Tagata o te Moana (Pacific culture), T Top 5, W Pacific Report, H Mailbox or RNZI Talk (meet the RNZI staff), F Dateline Pacific; 0330 T New Releases, W Tradewinds, H The World in Sport, F Pacific Correspondent. [*may be preempted by live sport].

Radio Prague

0300 D News; 0305 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0310 S Saturday Music (classical/folk/jazy), M From the Weeklies; 0315 M. The Arts, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Mailbax; 0320 W Talking Point, F Economic Report.

Radio Taipei International

0300 D News; 0315 S Instant Noodles, M Life on the Outside, T Taiwan Economic Journal, W Floating Air (traditional music), H Soundbite, F Miss Mook's Big Countdown (current pop hirs), A Naluwan; 0330 M Women in Taiwan, T Formosa Oldies, H Life Unusual, A Gran's Cafe.

Voice of Russia

0300 D News; 0311 M Sunday Panorama, T-S News & Views; 0324 M Russia: People & Events; 0330 D News in Brief; 0332 S Kaleidoscope (Russian events), M Audio Book

Club (Russian lit.), T/H/A 20th Century: Footprints in History, W/F Russian history/culture.

WBCQ, Maine

7415 kHz.: **0300** S The Big Kaboom.

WHRI. Indiana

5745 kHz.: 0300 S DXing with Cumbre, M Joe 2K, 0330 S Joe 2K.
7315 kHz.: 0305 S/M 2O, The Countdown Magazine (Christian rock music charts)
7580 kHz.: 0305 M-A Music (Christian contemporary and gospel); 0335 S Music (Chris

WWCR Tennessee

3215 kHz.: 0305 M America's Greatest Heroes; 0310 M Profiles.
5070 kHz.: 0300 A Spectrum (communications discussion); 0330 M The Old Record Shop (vintage recordings).

Radio Sweden

0330 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0345 T Sports Scan, W Media Scan (1st/3rd), H Money Matters, F Nordia Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Voice of Vietnam

0330 D News; 0335 D Current Affairs; 0340 Su Weekly Review, M Sunday Show, T/W/F/ A Press Review, H Talk of the Week; 0345 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0350 S Music, A Literature and Arts.

Frequencies .

Q400 Q430 Switzerfand, Swiss Rinternational 9655eu	0400 0400 0400 0400 0400 0400 0400	0415 0427 0430 0430 0430 0430 0430		Israel, Kol Israel Czech Rep, Radio Prague Intl Mexico, R Mexico International Mongolia, Voice of Nigeria, Radio/Kaduna S Africa, Channel Africa Sri Lanka, Sri Lanka BC Corp	6280va 7345na 9705am 12015as 6090do 5955af 6005as	7400va 7385na 11770am 12085as 7275do 6075as	9435va 9435na 6130do	17545va 9770as	0400 0400 0400 0400 0400 0400 0400	0500 0500 0500 0500 0500 0500 0500	mtwhfa vl/as vl/a	Russia, Voice of Russia WS Singapore R Corp of Singapore Solomon Islands, SIBC Solomon Islands, SIBC Switzerland, Swiss R International Uganda, Radio UK, BBC World Service	4976do 3255af	9905am 5026do 5975na	6005af	6005af
15325 15326 1532	0400 0400 0400	0445 0455 0456		Germany, Deutsche Welle USA, WYFR Okeechobee FL China China Radio International	7195af 6065na 9730na	9355eu	9505na						12095af 15575me 21830me	15280as 17760as	15310as 17790as	15420af 21660as
0400 0500 VI	0400 0400	0500 0500		Anguilla, Caribbean Beacon Australia, ABC/Alice Springs	15335 6090am 4835do	11830na	15335as	17735as				·	6350va 10940va 16847va	6458va	6847va	5765va 10320va 13362va
0400 0500 Camaroon, RTV/Yoounde 4850do 0400 0500 USA, WBCQ Monticello ME 7415na 9335na 0400 0500 0500 Canada, CERX Toronto ON 0407do 0500 USA, WHR Greenbush ME 7880na 7425na 7425na 0400 0500 USA, WHR Noblesville IN 7315sa 0400 0500	0400 0400	0500 0500		Australia, ABC/Tennant Creek Australia, Christian Voice	4910do 9865va 9660pa	12080pa	15240as	15415as	0400 0400 0400	0500 0500 0500		USA, KTBN Salt Lake City UT USA, KVOH Los Angeles CA USA, KWHR Naalehu HI	7510na 9975am 17780as	7170af	7290af	7415af
0400 0500 Canada, CKZU Vancouver BC 0400 0500 USA, WMLK Bethel PA 7555va 7465alt 7450va 745	0400 0400 0400 0400 0400	0500 0500 0500 0500 0500		Cameroon, RTV/Yaounde Canada, CBC Northem Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB Canada, CHNX Halifax, NS	4850do 9625do 6070do 6030do 6130do	4820do	7255do		0400 0400 0400 0400	0500 0500 0500 0500		USA, WEWN Birmingham AL USA, WHRA Greenbush ME USA, WHRI Noblesville IN USA, WINB Red Lion PA	7415na 5825va 7580na 7315sa 12160am	9335na 7425na	9885af	15205as
0400 0500 0400 0500	0400 0400 0400 0400	0500 0500 0500 0500		Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl Costa Rica, University Network Cuba, Radio Havana	6160do 7450va 5920al 6000na	6970va 9820na	11705na	15048va	0400 0400 0400 0400	0500 0500 0500 0500		USA, WMLK Bethel PA USA, WRMI Miami FL USA, WSHB Cypress Crk SC USA, WTJC Newport NC	7555va 7385am 7535eu 9370na	9465alt 12020af		
0400 0500 Kenya, Kenya BC Corp 4935do 0430 0457 Czech Rep., Radio Prague Intl 9865va 11600va 11880do 0430 0500 Iran, VOIRI 9830me 11985me 0430 0500 Iran, VOIRI 9830me 11985me 0430 0500 Netherlands, Radio 0430 0500 Nigeria, Radio/Ibadan 0500 vi	0400 0400 0400	0500 0500 0500 0500	,	Finland, Scandv Weekend Radio Germany, Unt Methodist Church Germany, Voice of Hope Guatemala, Radio Cultural	11690va 11775af 6185na	11720va 13685af	21455usb		0400 0400 0400	0500 0500 0500		USA, WWFV McCaysville GA Zambia, Christian Voice Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp	3270va 6065do 6165do	5085am 6265do 6045do	5070am	5935am
0400 0500 Malaysia, Voice of Islam 6175as 9750as 15295as 0430 0500 vl Nigeria, Radio/Lagos 3326do 4990do 0400 0500 Myanmar, Radio 9730do 0430 0500 vl S Africa, Adventist World Radio 12080dr 0400 0500 New Zealand, R New Zealand Int 17675pa 0430 0500 vl Nigeria, Radio/Lagos 3326do 4990do 0400 0500 New Zealand, R New Zealand Int 17675pa 0430 0500 wl Migeria, Radio/Lagos 3326do 4990do 0400 0500 New Zealand, R New Zealand Int 17675pa 0430 0500 wl mwhfa S Africa, Trans World Radio 4775af 0400 0500 vl Nigeria, Radio/Enugu 6025do 0430 0500 wl mwhfa S Africa, Trans World Radio 4774af 0400 0500 vl Nigeria, Radio/Enugu 6025do 0430 0500 wl Mwhfa Swaziland, Trans World Radio 4774af 0400 0500 vl Papua New Guinea, NBC 9675do 11880do	0400 0400 0400	0500 0500 0500		Kenya, Kenya BC Corp Lesotho, Radio Liberia, Voice of Hope	4935do 4800do 6280af				0430 0430 0430	0457 0500 0500	vl	Czech Rep, Radio Prague Intl Iran, VOIRI Netherlands, Radio	9865va 9830me 6165na	11600va 11985me		
0400 0500 Russia, Voice of Russia WS 7125na 7180na 12020na 15445na 0445 0500 USA, WYFR Okeechobee FL 9355eu	0400 0400 0400 0400 0400 0400 0400	0500 0500 0500 0500 0500 0500 0500		Malaysia, Radio Malaysia, Voice of Islam Myanmar, Radio Namibia, Namibian BC Corp New Zealand, R New Zealand Int New Zealand, ZIXA Nigeria, Radio/Enugu Papua New Guinea, NBC	6175as 9730do 3270af 17675pa 3935do 6025do 9675do	3289af 7290do 11880do		15445pg	0430 0430 0430 0430 0430 0430 0430	0500 0500 0500 0500 0500 0500 0500	vl mtwhfa	Nigeria, Radio/Kaduna Nigeria, Rodio/Lagos S Africa, Adventist World Radio S Africa, Trans World Radio S Africa, Trans World Radio Sri Lanka, Sri Lanka BC Corp Swaziland, Trans World Radio Swaziland, Trans World Radio	3326do 12080af 6035af 4775af 6130do 4774af 6035af		7275do	9570do

SELECTED PROGRAMS

BBC World Service (am)

0400 D The World Today; **0430** S Global Business, A Assignment; **0450** M Sports Roundup.

Channel Africa

0400 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio Intenational

0400 D News, 0410 S Report on Developing Countries, M-F Current Affairs, A Global Review, 0420 S In the Spotlight (cultural magazine), A Listeners' Garden; 0430 M People in the Know (Chino's leading citizens), T Sports World, W China Horizons (business), H Voices from Other Lands, E Life in China.

HCJB, Ecuador

0400 D Latin American & World News; 0410 S DX Parlyline, M Musical Mailbag, T-A Studio 9 (Latin American regional report); 0430 T Inside HCIB, W Saludos Amigos, H Ham Radio Today, F Woman to Woman, A Musica del Ecuador.

Radio Australia

0400 D News; 0405 S/A Pacific Focus (S arts, A environment); 0410 M-F Margaret Throsby (interviews and music); 0430 S Arts Talk, A Lazz Notes. [Special service: 0405 S/A Grandstand (live sports action) on 9660, 12080, 17580, 17715, 17750, 21725 kHz, only.]

Radio Habana Cuba

0400 M Weekly Review, T-S International News; 0410 S The World of Stamps, T-A Spotlight on the Americas; 0430 M The Mailbag Show, T-S News Bulletin; 0435 T-S Reports and music.

Radio Netherlands

0430 S/M News; T-A Newsline; 0435 S Europe Unzipped, M Sincerely Yours (letters); 0455 S Insight (commentary).

Radio New Zealand International

0400 D RNZ News; **0408** S A Question of Religion*, M-F In Touch with New Zealand (from 0205), A Music feature or series*.

Radio Vlaanderen Internationaal

O400 S Music from Flanders, M Radio World, T-A News; 0404 T-A Belgium Today; 0408 M Tourism in Flanders, T-A Press Review; 0413 T Focus on Europe, W Green Society (ecology), H/A Around the Arts, F Economics; 0414 M Brussels 1043 (letters); 0418 T Sports, H Around Town, F International Report, A Tourism in Flanders; 0424 M-A Soundbox (Flemish rock).

Swiss Radio International

0400 D Newsnet (Swiss magazine); 0410 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Szene (Includes Postcards from Switzerland-1st 8 Book Zone-3rd); 0415 H Book Zone (2nd only), A Business Spotlight; 0430 D Newsnet (Swiss magazine); 0440 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0445 H Book Zone (2nd only), A Business Spotlight.

Voice of Russia

0400 D News; 0411 S/M Musical Portraits of the 20th Century, T/F Moscow Mailbag, W/A Science and Engineering, H Newmorket (business); 0430 D News in Brief; 0432 S Moscow Yesterday and Today, M Jazz Show, T housic Around Us, W Musical Portraits of the 20th Century, H Folk Box, F Audio Book Club (Russian lit.), A Timelines; 0446 T Music At Your Request, W Russia: People & Events.

WBCQ, Maine

7315 kHz. **0400** S Tom & Darryl (electronic media), M-A Amos 'n Andy.

WHRI, Indiana

5745 kHz.: 0405 S Music (Christian contemporary and gospel), 0430 S DXing with Cumbre. 7315 kHz.: 0400 S 20,The Countdown Magazine (from 0305); 0405 M-F Music (Christian contemporary and gospel).

WWCR, Tennessee

3210 kHz.: **0400** T-S Worldwide Country Radio (country music). 5070 kHz.: **0430** M New Horizons (science/technology); **0445** M Ask WWCR (letters).



Frequencies .

0500 0505 0500 0505 sm 0500 0505 twhfa	USA, WWCR Nashville TN USA, WWCR Nashville TN USA, WWCR Nashville TN	2390am 3210am 3215am	5070am	5935am		0500 0500 0500	0600 0600 0600	vl	Nigeria, Radio/Ibadan Nigeria, Radio/Kaduna	6050do 4770do 3326do	6090do 4990do	7275do	9570do
0500 0530	Australia, Christian Voice	9865va	15185va	17645va	21680va	0500	0600	vl	Nigeria, Radio/Lagos Nigeria, Voice of	7255af	15120af		
0500 0530 0500 0530	Netherlands, Radio S Africa, Adventist World Radio	6165na 5960af	9590na 6015af			0500 0500	0600 0600	vl	Papua New Guinea, NBC Russia, Voice of Russia WS	9675do 15460au	11880do 15470au	15525au	17570au
0500 0530 0500 0530	S Africa, Channel Africa Switzerland, Swiss R International	15215af				0500	0600	mtwhfs			21790au		
0500 0530	Uganda, Radio	4976do	5026do			0500	0600		S Africa, Trans World Radio Singapore R Corp of Singapore	6150do			
0500 0530 0500 0530 vl	Vatican City, Vatican Radio Zimbabwe, Zimbabwe BC Corp	9660af 4828do	11625af 6045do	15570af		0500 0500	0600	vl	Solomon Islands, SIBC Spain, R Exterior Espana	5020do 6055na	9545do		
0500 0545	Germany, Deutsche Welle	5960na	6120na	9670na	11795na	0500	0600		Sri Lanka, Sri Lanka BC Corp	6130do	7000 (0500 (
0500 0556 0500 0559	China China Radio International Canada, R Canada International	9560na 9760af	11850af	11905me		0500 0500	0600 0600		Swaziland, Trans World Radio UK, BBC World Service	6035af 5975na	7200af 6005af	9500af 6175am	6190af
0500 0600 0500 0600 vl	Anguilla, Caribbean Beacon Australia, ABC/Alice Springs	6090am 4835do								6195eu 11760me	7160af	9410eu 11940af	9740as 11955pa
0500 0600 vl	Australia, ABC/Katherine	5025do								12095eu	15280as	15360as	15420as
0500 0600 vl 0500 0600	Australia, ABC/Tennant Creek Australia, Radio	4910do 9660pa	12080pa	15240as	15515va					15575me 21660as	17640at	17760as	17790as
	Australia, Radio	17580va	21725va			0500	0600		USA, Armed Forces Radio	4278va 6350va	4319va 6458va	4993va 6847va	5765va 10320va
0500 0600 as 0500 0600 vl	Botswana, Radio	17750as 3356do	4820do	7255do						10940va	12579va	12689va	13362va
0500 0600 vl 0500 0600	Cameroon, RTV/Yaounde Canada, CBC Northern Service	4850do 9625do				0500	0600		USA, KAIJ Dallas TX	16847va 5755va			
0500 0600	Canada, CFRX Toronto ON	6070do				0500	0600		USA, KTBN Salt Lake City UT	7510na			
0500 0600 0500 0600	Canada, CFVP Calgary AB Canada, CHNX Halifax, NS	6030do 6130do				0500 0500	0600 0600		USA, KVOH Los Angeles CA USA, KWHR Naalehu HI	9975am 11565pa	17780as		
0500 0600 0500 0600	Canada, CKZN St John's NF Canada, CKZU Vancouver BC	6160do 6160do				0500	0600		USA, Voice of America	5970af 7295af	6035af 9700af	6080af 9775af	7170af 11825eu
0500 0600	Costa Rica, R for Peace Intl	7450va	15048va							12080af	15205as	///Jul	1102360
0500 0600 0500 0600	Costa Rica, University Network Cuba, Radio Havana	5920al 9550na	6970va 9820na	7480va 9830na	15048va	0500 0500	0600		USA, WBCQ Monticello ME USA, WEWN Birmingham AL	7415na 5825va	9330na 7425na		
0500 0600	Ecuador, HCJB	9745na	11840na	21455usb		0500	0600		USA, WHRA Greenbush ME	7435af			
0500 0600 a/monthly 0500 0600	Finland, Scandv Weekend Radio Germany, Deutsche Welle	6140eu	11720va			0500 0500	0600 0600		USA, WHRI Noblesville IN USA, WJCR Upton KY	7315sa 7490va	13595as		
0500 0600 0500 0600	Germany, Unt Methodist Church Guyana, Voice of	11775af 3289do	13685af 5949do			0500 0500	0600		USA, WMLK Bethel PA USA, WRMI Miami FL	7555va 7385am	9465alt		
0500 0600	Japan, Radio	5975eu	6110na	7230eu	11715as	0500	0600		USA, WSHB Cypress Crk SC	7535eu	15195af		
0500 0600	Kenya, Kenya BC Corp	11760as 4935do	15150as	17810as	21/55pa	0500 0500	0600 0600		USA, WTJC Newport NC USA, WWFV McCaysville GA	9370na 3270va	5085am		
0500 0600 0500 0600 vl	Kuwait, Radio Lesotho, Radio	15110va 4800do				0500 0500	0600 0600	vl	USA, WYFR Okeechobee FL Vanuatu, Radio	5985na 3945do	9355eu 4960do	11550eu 7260do	
0500 0600 vl	Liberia, R Liberia International	5100do				0500	0600		Zambia, Christian Voice	6065do		720000	
0500 0600 0500 0600 vl	Liberia, Voice of Hope Malawi, Malawi BC Corp	6280af 3380do	5995do			0500 0502	0600	vl	Zambia, National BC Corp S Africa, Trans World Radio	6165do 9500af	6265do		
0500 0600	Malaysia, Radio	7295do				0505	0600		USA, WWCR Nachville TN	2390am	3210am	5070am	5935am
0500 0600 0500 0600	Malaysia, RTM Sarawak Malaysia, Voice of Islam	7160do 6175as	9750as	15295as		0515 0525	0525 0600		Rwanda, Radio Ghana, Ghana BC Corp	6055do 3366do	4915do		
0500 0600 0500 0600	Myanmar, Radio Namibia, Namibian BC Corp	9730do 3270af	3289af			0530 0530	0600	vl	Italy, IRRS Thailand, Radio	3985va 12015eu			
0500 0600	New Zealand, R New Zealand In	t 17675pa				0530	0600	. 1.6	UAE, Radio Dubai	13675au	15435au	21700au	
0500 0600 0500 0600 vl	New Zealand, ZLXA Nigeria, Radio/Enugu	3935do 6025do	7290do			0530 0530	0600 0600		UK, BBC World Service Zimbabwe, Zimbabwe BC Corp	17885af 5975do	6045do		

SELECTED PROGRAMS

BBC World Service (am)

0500 M The World Today, T-S News, 0505 S Wright Around the World (musical variety), T Meridian-Masterpiece, W Meridian-Ideas, H Meridian-Sareen, F Meridian-Music, A Meridian-Writing, 0530 M Play of the Week (radia thereity). T Panel game or Quiz, W Music Mix, H UK Top Twenty, F Omnibus (documentary), A World of Music.

Channel Africa

0500 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0500 D News, 0510 S Report on Developing Countries, M-F Current Affairs, A Global Review, 0520 S In the Spotlight (cultural magazine), A Listeners' Gorden; 0530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (business), H Voices from Other Lands, F Life in China.

Deutsche Welle

0500 D News; 0505 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current offairs); 0515 S Marks & Markets, M (COD1! (youth magazine); 0530 T Insight (international affairs), W Man & Environment; H Living in Germany, F Spotlight on Sport, A German by Radio.

HCJB, Ecuador

0500 S Ham Rodio Today, M Sunday Nite, T Let My People Think, W The Book & the Spade (archoeology), H Adventures in Odyssey (Christian stories for children), F Inspirational Classics (litrugical music), A Walkin' in the Sunshine (country music), 0515 W Words for Women, 0530 S Inside HCIB, T-A A New Beginning; 0556 T-A A Slice of Infinity.

Radio Australia

0500 D News; 0505 S/A Pacific Focus (S business, A sport); 0510 M-F Pacific Beat (Pacific islands magazine with regional sports report @ 0530); 0530 S Fine Music Australia (dassical), A Lingua Franca (about language); 0545 A Short Story. [Special service: 0505 S/A Grandstand (live sports action) on 9660, 12080, 17580, 17715, 17750, 21725 kHz, only.]

Radio Habana Cuba

0500 M Top Tens, T-S International News; 0510 T-S National News; 0515 T-S Viewpoint; 0530 M The Jazz Place, T-S News Bulletin; 0535 T-A Time Out (sports); 0540 S/W DXers Unlimited, M/F Caribbean Outlook, H Mailbag Show, A Weekly Review.

Radio Japan

0500 D News; 0510 S Roundup Asia (regional magazine), A Hello from Tokyo (listener contact); 0515 M-F 44 Minutes (feature magazine).

Radio Netherlands

0500 S Sound Fountain (soundscapes), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Encore (best of RN), A A Good Life (global development).

Radio New Zealand International

0500 D RNZ News; 0505 S Whenua! (Maori culture), M-F Checkpoint (comprehensive news), A Tagata o te Moana (Pacific culture).

Spanish Foreign Radio

0500 S Visitors' Book, M Window on Spain, T-A News; 0515 S American Chronicles, M Entremeses (food/Yourism); 0529 M Music, series; T-A Spanish Pop Music, 0532 S Spain in the American West, T-A Press Review; 0535 T Entertainment in Spain, W Kaleidoscope (life in Spain), H As Others See Us, F Africa Today, A Radio Club (letters); 0547 S Radio Waves, M Radio Club (repeat), T-A Spanish Language Course.

Voice of Nigeria

0500 S Reflections, M-F Wave Train (music), A African Safari (music); 0505 S Link-Up (music requests); 0530 S/A News, M-F VON Scope (news magazine).

WBCQ, Maine

0500 S Radio Timtron Worldwide.

WHRI, Indiana

5745 kHz: 0500 A DXing with Cumbre; 0530 A World Harvest Country Style.
7315 kHz: 0500 M-F Music (Christian contemporary and gospel), A DXing with Cumbre.
7435 kHz: 0500 A Joe 2 K.

WWCR, Tennessee

3210 kHz.: **0500** M World of Radio; **0505** A Rock the Universe (Christian rock music); **0530** M Communications World. 5070 kHz.: **0500** T Ask WWCR (letters)

Frequencies

Octoon O	55au
0600 0630 USA, Voice of America 5970af 7795af 7795af 11805af 11825eu 0600 0700 Singapore R Corp of Singapore 05020ab 9545ab 0600 0700 Solomon Islands, SIBC 5020ab 9545ab 0600 0700 Singapore R Corp of Singapore 05020ab 9545ab 0600 07	
11930af 12980af 15205as 15600af 0600 0700 Sri Lanka, Sri Lanka BC Corp 6130do 0600 07000 0700 0700 0700 0700 0700 0700 0700 0700 070	
0600 0700 V Australia, ABC/Alice Springs 0600 0700 V Australia, ABC/Katherine 5025do 0700 V Australia, ABC/Tennant Creek 0710 0700 V Australia, ABC/Tennant Creek 0710 0700 0700 Australia, ABC/Tennant Creek 07150 0700 0	
0600 0700 Australia, Radio 9660pa 12080pa 15240as 15415as 17580as 17750as 21725va 17580as 17750as 21725va 17580as 17750as 21725va 17750as 21725va 17750as 17770as 17885af 17750as 17770as 17885af 17750as 17770as 17885af 17770as 17	Das
0600 0700 VI	20af
0600 0700 Canada, CFVP Calgary AB 6030do 6000 0700 Canada, CHNX Halifax, NS 6130do 16847va 12689va 1330 10000 16847va 12689va 1330 100000 100000 100000 100000 100000 100000 100000 100000 100000 100000 1000000	5va
0600 0700 Canada, CKZU Vancouver BC 61600 15048va 0600 0700 USA, KTBN Salt Lake City UT 7510na 9975am 0600 0700 Costa Rica, R for Peace Intl 7450va 15048va 0600 0700 USA, KVHOR Los Angeles CA 9975am 0600 0700 Costa Rica, University Network 9520al 6970va 7480va 15048irr 0600 0700 USA, KWHR Nalelbu HI 11565pa 17780as 0600 0700 Cuba, Radio Hovana 9550na 9820na 9830na 0600 0700 USA, WEQ Monticello ME 7415na 0600 0700 Full Angeles CA 9745na 11840na 21455usb 0600 0700 USA, WERN Birmingham AL 5825va 7425na 0600 0700 Germany, Deutsche Welle 6140eu 11720va 0600 0700 USA, WHR Noblesville IN 7315sa	
0600 0700 Costa Rica, University Network 5920al 6970va 7480va 15048irr 0600 0700 USA, KWHR Naalehu HI 11565pa 17780as 0600 0700 Cuba, Radio Havana 9550na 9820na 9830na 0600 0700 USA, WBCQ Monticello ME 7415na 0600 0700 a/monthly Finland, Scandy Weekend Radio 11690va 11720va 11720va 0600 0700 USA, WBKN Birmingham AL 5825va 7425na 0600 0700 Germany, Deutsche Welle 6140eu 11720va 0600 0700 USA, WHRI Noblesville IN 7315sa	
0600 0700 a/monthly Finland, Scandv Weekend Radio 11690va 11720va 0600 0700 USA, WHRA Greenbush ME 7435af 0600 0700 USA, WHRI Noblesville IN 7315sa	
0600 0700 Germany Overcomer Ministries 9/30ng 13810gu 1 0600 0700 1154 WICR Inton KV 7/400ga 13505gg	
0600 0700 vl Ghana, Ghana BC Corp 3366do 4915do 0600 0700 USA, WMLK Bethel PA 7555va 9465alt 0600 0700 Guyana, Voice of 3289do 5949do 0600 0700 USA, WRMI Miami FL 7385am	
0600 0700 vl Italý, IRŘS 3985va 0600 0700 USA, WSHB Cypress Crk SC 7535af 0600 0700 Japan, Radio 9685pa 7230eu 11740as 15195as 0600 0700 USA, WTJC Newport NC 9370na 21755pa 0600 0700 USA, WWCR Nashville TN 2390am 3210am 5070am 593:	5.00
0600 0700 Kenya, Kenya BC Corp 4935do 0600 0700 USA, WWFV McCaysville GA 3270va 5085am 0600 0700 Kuwait, Radio 15110va 0600 0700 USA, WYFR Okeechobee FL 5985na 7355eu	70111
0600 0700 vl Lesotho, Radio 4800do 7260do 0600 0700 vl Liberia, ELWA 4760do 0600 0700 Yemen, Rep of Yemen Radio 9780do 0600 0700 vl Liberia, R Liberia International 5100do 0600 0700 Zambia, Christian Voice 9865do	
0600 0700 Liberia, Voice of Hope 6280af 0600 0700 vl Zambia, National BC Corp 6165do 6265do 0600 0700 Vl Malawi, Malawi BC Corp 3380do 5995do 0600 0700 vl Zimbabwe, Zimbabwe BC Corp 5975do 6045do 0600 0700 Malaysia, Radio 7295do 0610 0615 mtwhf Vatican City, Vatican Radio 4005eu 5883eu 6185eu 964:	5eu
0600 0700 Malaysia, RTM Sarawak 7160do 11740eu 15595eu 0600 0700 Malaysia, Voice of 6175as 9750as 15295as 0610 0620 mtwhf Greece, Voice of 7475eu 9420eu 11900au 1565 0600 0700 Monaco, Trans World Radio 9870eu 17520me	
0600 0700 Myanmar, Radio 9730do 0615 0630 a S Africa, Trans World Radio 11640af 0600 0700 Namibia, Namibian BC Corp 3270af 3289af 0630 0700 USA, Voice of America 5995af 7170af 11825eu 1193	30af
0600 0700 New Zealand, ZLXA 3935do 7290do 15205as 15205as 0600 0700 vl Nigeria, Radio/Enugu 6025do 0630 0700 as USA, Voice of America 5970af 6035af 6080af 729s 0600 0700 vl Nigeria, Radio/Ibadan 6050do 11805af 12080af 15600af	iaf
0600 0700 vI Nigeria, Radio/Kaduna 4770do 6090do 7275do 9570do 0630 0700 Vatican City, Vatican Radio 11625af 13765af 15570af 0600 0700 vI Nigeria, Radio/Lagos 3326do 4990do 0641 0656 Romania, R Romania International6135eu 7105eu 9510eu 1199 0600 0700 vI Nigeria, Voice of 7255af 15120af 0645 0655 as Monaco, Trans World Radio 9870eu 0600 0700 vI Papua New Guinea, NBC 9675do 11880do 0655 0700 Monaco, Trans World Radio 9870eu	10eu

SELECTED PROGRAMS

BBC World Service (am)

0600 M Play of the Week (from 0530), T-S World Briefing; 0620 T-S Sports Roundup; 0630 S Agenda (trends), M-F World Business Report, A People and Politics; 0645 M Letter from America (Alistair Cooke comments), T/W/F Analysis, H From Our Own Correspondent.

Channel Africa

0600 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

HCJB, Ecuador

0600 S Saludos Amigos, M Mountain Meditations, T-S Family Life Today; 0630 S Did You Hear?, M Renewing Your Mind, T-A Stories of Great Christians; 0645 S/H Specialized English, T Chards C love (Sarzed music), W CCR Drama, F Science, Scripture & Salvation, A Wonderful Words of Life (hymns).

Radio Australia

0600 D News; 0605 S The Europeans, A Feedback (letters/station news); 0610 M-F Regional Sports Report; 0620 M-F Pacific Focus (M business, T health, W environment, H sport, F culture); 0630 A Oz Sounds (Australian music); 0640 M Oz Music Show (nock), T/F Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal), H Australian Country Style. [Special service: 0605 S/A Grandstand (live sports action) on 9660, 12080, 17580, 17715, 17750, 21725 kHz. only.]

Radio Habana Cuba

0600 M Breakthrough (science), T-S International News; 0610 S The World of Stamps, T-A Spotlight on the Americas; 0630 M From Havana (Cuban music), T-S News Bulletin; 0635 T-S Reports and music.

Radio Japan

0600 D News; 0610 S Weekend Square (Japanese life), A Roundup Asia (regional magazine); 0615 M-F Asian Top News (headlines from region's radio); 0625 M Music Journey Around Japan, T Lef's Try Japanese, W Unforgettable Music Masterpieces, H Brush Up Your Japanese, F Music Beat.

Radio New Zealand International

0600 D RNZ News; 0606 S Storytime (children), M-F Worldwatch (international news), A Focus on Politics; 0630 M Letter from America (BBC), T-H Today in Parliament, F The Pacific Report, A In a Mellow Tone (soft sounds); 0655 D Golden Kiwis (prominent NZers).

Voice of Nigeria

0600 S This Week on VON, M Across the Ages, T Agenda for Peace, W Nigerian Newsletter, H West African Scene, F African Writers, A From the Racks; 0615 S Listeners' Letters, M

Nigerio & Politics, T Nigerion Scene, W Wheel of Progress, H World of the Arts, F Images of Nigeria, A Issues of the Moment; **0630** S/A Weekly Analysis, M-F World News; **0640** M-F Commentary & Press Review; **0645** M-F News about Nigeria.

WHRI, Indiana

5745 kHz.: 0630 S DXing with Cumbre.

7315 kHz.: 0604 A Turn Your Radio On; 0630 S World Harvest Country Style.

WWCR, Tennessee

3210 kHz.: 0600 SThe Big Backyard (Australian country music), M Spectrum (communications discussion; 0605 T-F Golden Age of Radio Theatre; 0630 SThe Old Record Shop (vintage recordings).

5070 kHz.: **0600** M Ken's Country Classics; **0630** S World of Radio.

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It's painless, we promise. Contact our advertising manager, Beth Leinbach, at 828-389-4007.

0700 UTC

3:00 AM EDT 2:00 AM CDT 12:00 AM PDT

Shortwave Guide

4:00 AM EDT 3:00 AM CDT 1:00 AM PDT 0800 UTC

Frequencies

INLUULINCILS	• • • • • • • • •	• • •			• • • •	• • •	• •			• • •		• • • •	• • • • •
0700 0705	New Zealand, R New Zealand Int	17675pa				0800	0810	vl	Malawi, Malawi BC Corp	3380do	5995do		
0700 0715 a	Greece, Voice of	9375eu	11900au	17520me		0800	0820		Monaco, Trans World Radio	9870eu			
0700 0720 a 0700 0730	S Africa, Trans World Radio	7200af	9500af			0800	0825		Malaysia, Voice of	6275as	9750as	15295as	
0700 0730 vl	Belgium, Radio Vlaanderen Intl Papua New Guinea, NBC	5985eu 9675do	11880do			0800	0827		Czech Rep, Radio Prague Intl	11600eu	15255eu		
0700 0730	Slovakia, R Slovakia International	15460au	17550au	21705au		0800 0800	0830 0830	vl vl	Australia, ABC/Alice Springs Australia, ABC/Katherine	4835do 5025do			
0700 0730 a	USA, Voice of America	6873va				0800	0830	vl	Australia, ABC/Tennant Creek	4910do			
0700 0735 mtwhf 0700 0735	S Africa, Trans World Radio	6035af	9500af 7200af	0500-1		0800	0830		Myanmar, Radio	9730do			
0700 0735 0700 0745 as	Swaziland, Trans World Radio UK, BBC World Service	6035af 17885af	/ 200at	9500af		0800	0845		Germany, Deutsche Welle	6140eu			
0700 0745	USA, WYFR Okeechobee FL	7355eu	9985eu	11850eu		0800	0900		Anguilla, Caribbean Beacon	6090am			
0700 0756	Romania, R Romania International		21480af			0800	0900		Australia, Radio	5995pa	9580va	9710as	12080pa
0700 0800	Anguilla, Caribbean Beacon	6090am				0800	0900	mtwhf	13605va Bhutan, Bhutan BC Service	15125as 6035do	15415as	17750as	21725va
0700 0800 vl 0700 0800 vl	Australia, ABC/Alice Springs Australia, ABC/Katherine	4835do 5025do				0800	0900	vl	Botswana, Radio	7255do	9600do	7255do	
0700 0800 vl	Australia, ABC/Tennant Creek	4910do				0800	0900	vl	Cameroon, RTV/Yaounde	4850do	700000	720000	
0700 0800	Australia, Radio	9660pa	12080pa	15240as	15415as	0800	0900		Canada, CFRX Toronto ON	6070do			
0700 0000 1	17580va	17750as	21725va	70551		0800	0900		Canada, CFVP Calgary AB	6030do			
0700 0800 vl 0700 0800 vl	Botswana, Radio Cameroon, RTV/Yaounde	7255do 4850do	9600do	7255do		0800	0900		Canada, CHNX Halifax, NS	6130do			
0700 0800 11	Canada, CFRX Toronto ON	6070do				0800	0900		Canada, CKZN St John's NF	6160do			
0700 0800	Canada, CFVP Calgary AB	6030do				0800 0800	0900 0900		Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl	6160do 15048va			
0700 0800	Canada, CHNX Halifax, NS	6130do				0800	0900		Costa Rica, University Network	5920al	6970va	15048irr	
0700 0800 0700 0800	Canada, CKZN St John's NF Canada, CKZU Vancouver BC	6160do 6160do				0800	0900		Ecuador, HCJB	9780eu	11755pa	21455usb	
0700 0800	Costa Rica, R for Peace Intl	7450va	15048va			0800	0900	mtwhf	Eqt Guinea, Radio Africa	15185af			
0700 0800	Costa Rica, University Network	5920al	6970va	7480va	15048irr	0800	0900	as/vl	Eqt. Guinea, Radio East Africa	15185af			
0700 0800	Ecuador, HCJB	9780eu	11755pa	21455usb		0800	0900	a/monthly	Finland, Scandy Weekend Radio	11690va	11720va		
0700 0800 mtwhf 0700 0800 as/vl	Eqt Guinea, Radio Africa Eqt. Guinea, Radio East Africa	15185af 15185af				0800 0800	0900 0900		Germany, Deutsche Welle Germany, Overcomer Ministries	6140eu 13800pa	13810pa		
0700 0800 a/monthly	Finland, Scandy Weekend Radio	11690va	11720va			0800	0900		Germany, Trans World Radio	12070eu	13010pa		
0700 0800	Germany, Deutsche Welle	6140eu				0800	0900		Germany, Voice of Hope	5975eu	21590me		
0700 0800	Germany, Overcomer Ministries	9430pa	13810au			0800	0900	vl	Ghana, Ghana BC Corp	3366do	4915do		
0700 0800 as 0700 0800	Germany, Trans World Radio	12070eu 5975eu	21590me			0800	0900		Guam, Trans World Radio	15200as	15330au		
0700 0800 vl	Germany, Voice of Hope Ghana, Ghana BC Corp	3366do	4915do			0800	0900		Guyana, Voice of	3289do	5949do		
0700 0800 vl	Ghana, Ghana BC Corp	3366do	4915do			0800	0900	17	Indonesia, Voice of	9525va	11785va	15149va	
0700 0800	Guyana, Voice of	3289do	5949do			0800 0800	0900 0900	vl/as	Italy, IRRS Kenya, Kenya BC Corp	7120va 4935do			
0700 0800 vl/mtwhf 0700 0800	Italy, IRRS Kenya, Kenya BC Corp	7120va 4935do				0800	0900	vl	Lesotho, Radio	4800do			
0700 0800	Kuwait, Radio	15110va				0800	0900	vl	Liberia, ELWA	4760do			
0700 0800 vl	Lesotho, Radio	4800do				0800	0900	vl	Liberia, R Liberia International	5100do			
0700 0800 vl	Liberia, ELWA	4760do				0800	0900		Liberia, Voice of Hope	6280af			
0700 0800 vl	Liberia, R Liberia International	5100do				0800	0900		Malaysia, Radio	7295do			
0700 0800 0700 0800 vl	Liberia, Voice of Hope Malawi, Malawi BC Corp	6280af 3380do	5995do			0800	0900 0900	S	Malta, Voice of Mediterranean	11770eu	7015.5		
0700 0800	Malaysia, Radio	7295do	377300			0800 0800	0900		Namibia, Namibian BC Corp New Zealand, R New Zealand Int	7165af 15175pa	7215af		
0700 0800	Malaysia, RTM Sarawak	7160do				0800	0900		New Zealand, ZLXA	3935do	7290do		
0700 0800	Malaysia, Voice of	6275as	9750as	15295as		0800	0900	vl	Nigeria, Radio/Enugu	6025do			
0700 0800 0700 0800	Myanmar, Radio Namibia, Namibian BC Corp	9730do 3270af	3289af			0800	0900	vl	Nigeria, Radio/Ibadan	6050do			
0700 0800	New Zealand, ZLXA	3935do	7290do			0800	0900	νl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0700 0800 vl	Nigeria, Radio/Enugu	6025do				0800	0900	vl	Nigeria, Radio/Lagos	3326do	4990do	0005	15705
0700 0800 vl	Nigeria, Radio/Ibadan	6050do	(000	7075	0.570	0800 0800	0900 0900	vl	Palau, KHBN/Voice of Hope Papua New Guinea, NBC	9955as 4890do	9965as 9675do	9985as	15725as
0700 0800 vl 0700 0800 vl	Nigeria, Radio/Kaduna Nigeria, Radio/Lagos	4770do 3326do	6090do 4990do	7275do	9570do	0800	0900	VI	Russia, Voice of Russia WS	9905au	15460au	15470au	17495au
0700 0800 11	Palau, KHBN/Voice of Hope	9965as	9985as	15725as		""	0,00		17525au	17570au	1010000	1017000	., .,
0700 0800	Russia, Voice of Russia WS	9905au	15460au	15470au	17495au	0800	0900	S	S Africa, Amateur Radio League	9750af	21560af		
0700 0000	17525au	17570au	17655au			0800	0900		Sierra Leone, Sierra Leone BS	3316do			
0700 0800 0700 0800	Sierra Leone, Sierra Leone BS Singapore R Corp of Singapore	3316do 6150do				0800	0900		Singapore R Corp of Singapore	6150do			
0700 0800 vl	Solomon Islands, SIBC	5020do	9545do			0800	0900 0900	vl	Solomon Islands, SIBC South Korea, R Korea Intl	5020do 9570va	13670va		
0700 0800	Sri Lanka, Sri Lanka BC Corp	6130do				0800	0900		Sri Lanka, Sri Lanka BC Corp	6130do	1307000		
0700 0800	Taiwan, R Taiwan International	5950na	71101	710/		0800	0900		Uganda, Radio	5026do	7110do	7196do	
0700 0800 0700 0800	Uganda, Radio UK, BBC World Service	5026do 6175am	7110do 6190af	7196do 9410eu	9580pa	0800	0900		UK, BBC World Service	6190af	9410eu	9740as	11940af
0700 0000	9740as	11760me	11765af	11940af	11955pa					12095eu	15310as	15360as	15400af
	12095eu	15310as	15360as	15400af	15485eu					15565eu	17640eu	17760as	17830af
	15565eu	17640eu	17760as	17790as	17830af	0800	0900		21660as UK, BBC World Service	21830me 15575as	17885af		
0700 0800	21660as USA, Armed Forces Radio	4278va	4319va	4993va	5765va	0800	0900	as	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
	6350va	6458va	6847va	10320va	10940va				6350va	6458va	6847va	10320va	10940va
	12579va	12689va	13362va	16847va					12579va	12689va	13362va	16847va	
0700 0800 0700 0800	USA, KAIJ Dallas TX USA, KTBN Salt Lake City UT	5755va 7510na				0800	0900		USA, KAIJ Dallas TX	5755va			
0700 0800	USA, KWHR Naalehu HI	11565pa	17780as			0800	0900		USA, KNLS Anchor Point AK	9615as			
0700 0800	USA, WEWN Birmingham AL	5825va	7425na			0800	0900 0900		USA, KTBN Salt Lake City UT USA, KWHR Naalehu HI	7510na 11565pa	17780as		
0700 0800	USA, WHRA Greenbush ME	7435af				0800	0900		USA, Voice of America	11995as	13615as	15150as	
0700 0800 0700 0800	USA, WHRI Noblesville IN USA, WJCR Upton KY	7315sa 7490va	13595as			0800	0900		USA, WEWN Birmingham AL	5825va	7425na		
0700 0800	USA, WMLK Bethel PA	7555va	9465alt			0800	0900		USA, WHRA Greenbush ME	7435af			
0700 0800	USA, WRMI Miami FL	7385am				0800	0900		USA, WHRI Noblesville IN	7315sa			
0700 0800	USA, WSHB Cypress Crk SC	7535af				0800	0900		USA, WJCR Upton KY	7490va	13595as		
0700 0800 0700 0800	USA, WTJC Newport NC	9370na	2210	5070	5935am	0800 0800	0900 0900		USA, WMLK Bethel PA USA, WRMI Miami FL	7555va 7385am	9475alt		
0700 0800	USA, WWCR Nashville TN USA, WWFV McCaysville GA	2390am 3270va	3210am 5085am	5070am	3933diii	0800	0900		USA, WSHB Cypress Crk SC	7535eu	9845pa		
0700 0800 vl	Vanuatu, Radio	3945do	4960do	7260do		0800	0900		USA, WTJC Newport NC	9370na	70 lopu		
0700 0800	Zambia, Christian Voice	9865do	10151			0800	0900		USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0700 0800 vl 0700 0800 vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp	6165do 5975do	6265do 6045do			0800	0900	vl	Vanuatu, Radio	3945do	4960do	7260do	
0705 0800 VI	New Zealand, R New Zealand Int	15175pa	004000			0800	0900		Zambia, Christian Voice	9865do	/0/5!		
0730 0758	Finland, YLE/R Finland	9510va	21670va			0800 0800	0900 0900	vl vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp	6165do 5975do	6265do 6045do		
0730 0800	Austria, R Austria International	6155eu	13730eu			0815	0900	f	Seychelles, FEBA Radio	15460as	JU7JUU		
0730 0800 as 0730 0800 vl	Guam, Trans World Radio Papua New Guinea, NBC	15200as 4890do	9675do			0820	0850	S	Monaco, Trans World Radio	9870eu			
0730 0800 VI	Switzerland, Swiss R International	9885af	13635af	17665af		0830	0900	vl	Australia, ABC/Alice Springs	2310do			
0740 0800 mtwhf	Guam, Trans World Radio	15200as				0830	0900	vl	Australia, ABC/Katherine	2485do			
0745 0800 as	UK, BBC World Service	15575as	17885af	17520		0830	0900	vl	Australia, ABC/Tennant Creek	2325do	21770-4		
0750 0800 as 0755 0800 mtwhf	Greece, Voice of Germany, Trans World Radio	9375eu 12070eu	11900au	17520me		0830 0855	0900 0900	,	Switzerland, Swiss R International Taiwan, CBS	9885as 11725as	21770af		
2,00 0000 11111111	22a.iji ilala mona kaalo	. 207 000				5555	0,00	3		1172303			

0900 UTC

5:00 AM EDT 4:00 AM CDT 2:00 AM PDT

Shortwave Guide

6:00 AM EDT 5:00 AM CDT 3:00 AM PDT 1000 UTC

LKF	:QUL	:NCIE2	• • • • • • • • •	• • •	• • • •	• • •	• • • • •	• • •	• •	• • • •	• • • • • • • • •	• • •		• • •	• • • •
0900	0915	vl	Ghana, Ghana BC Corp	3366do	4915do			1 1000	1027		Vietnam, Voice of	9839as	12019as		
0900	0915	mtwhf	Guam, Trans World Radio	15200as	171000			1000	1029		Czech Rep, Radio Prague Intl	21745va	1201703		
0900	0930		Guam, Trans World Radio	15330au				1000	1030		Guam, Adventist World Radio	15330as			
0900	0930		UK, BBC World Service	6195as	9605as	9740as	11760me	1000	1030		Singapore, RTE Radio	11740au			
			11765as	11945as	11955pa	12095eu	15190sa	1000	1030		Sri Lanka, Sri Lanka BC Corp	4940do			
			15310as	15360as	15400af	15485eu	15565eu	1000	1045	а	Austria, R Austria International	6155eu	13730eu	15010	
			15575as 17885af	17640eu 21470af	17760as 21660as	17790as	17830af	1000	1056 1100		China China Radio International Anguilla, Caribbean Beacon	11675pa 11775am	11730pa	15210pa	
0900	0945		Germany, Deutsche Welle	6160pa	11785af	12055as	15410af	1000		vl	Australia, ABC/Alice Springs	2310do			
0,00	0,10		17770va	17800af	17820pa	17845va	17860af	1000	1100	vl	Australia, ABC/Katherine	2485do			
			21560af					1000	1100	vl	Australia, ABC/Tennant Creek	2325do			
0900	0956		China China Radio International	11675pa	11730pa	15210pa		1000	1100		Australia, Radio	9580va	13605va	15110as	17750as
0900	1000		Anguilla, Caribbean Beacon	6090am				1,000	1100		21820va	(005)			
0900 0900	1000	vl vl	Australia, ABC/Alice Springs Australia, ABC/Katherine	2310do 2485do				1000	1100 1100	as vl	Bhutan, Bhutan BC Service Botswana, Radio	6035do 7255do	9600do	7255do	
0900	1000	vl	Australia, ABC/Tennant Creek	2325do				1000	1100	vl	Cameroon, RTV/Yaounde	4850do	700000	723300	
0900	1000	"	Australia, Radio	9580va	13605va	15110va	21820va	1000	1100	*1	Canada, CFRX Toronto ON	6070do			
0900	1000	as	Australia, Radio	15400as	17750as			1000	1100		Canada, CFVP Calgary AB	6030do			
0900	1000	vl	Botswana, Radio	7255do	9600do	7255do		1000	1100		Canada, CHNX Halifax, NS	6130do			
0900	1000	vl	Cameroon, RTV/Yaounde	4850do				1000	1100		Canada, CKZN St John's NF	6160do			
0900 0900	1000		Canada, CFRX Toronto ON Canada, CFVP Calgary AB	6070do 6030do				1000	1100 1100		Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl	6160do 15048va			
0900	1000		Canada, CHNX Halifax, NS	6130do				1000	1100		Costa Rica, University Network	5920al	6970va	15048irr	
0900	1000		Canada, CKZN St John's NF	6160do				1000	1100		Ecuador, HCJB	11755pa	21455usb	10040111	
0900	1000		Canada, CKZU Vancouver BC	6160do				1000	1100	mtwhf	Eqt Guinea, Radio Africa	15185af			
0900	1000		Costa Rica, R for Peace Intl	15048va				1000	1100	as/vl	Eqt. Guinea, Radio East Africa	15185af			
0900	1000		Costa Rica, University Network	5920al	6970va	15048irr		1000	1100	a/monthly	Finland, Scandy Weekend Radio	11690va	11720va		
0900 0900	1000	444	Ecuador, HCJB	11775pa 15185af	21455usb			1000	1100 1100		Germany, Deutsche Welle Germany, Voice of Hope	6140eu 21590me			
0900	1000	mtwhf as/vl	Eqt Guinea, Radio Africa Eqt. Guinea, Radio East Africa	15185af				1000	1100	vl	Ghana, Ghana BC Corp	6130do	4915do		
0900	1000	a/monthly	Finland, Scandy Weekend Radio	11690va	11720va			1000	1100	vl/as	Ghana, Ghana BC Corp	4915do	4915do		
0900	1000	-, - ,	Germany, Deutsche Welle	6140eu				1000	1100		Guam, Adventist World Radio	11660as			
0900	1000	а	Germany, Good News World R	5985eu	5995eu			1000	1100		Guyana, Voice of	5949do			
0900	1000		Germany, Trans World Radio	12070eu				1000	1100		India, All India Radio	11585as	13700au	15020as	17485au
0900 0900	1000		Germany, Voice of Hope Guyana, Voice of	21590me 3289do	5949do			1000	1100	vl/as	17840au Italy, IRRS	17895au 7120va			
0900	1000	vl/as	Italy, IRRS	7120va	374700			1000	1100	VI/US	Japan, Radio	9695as	15590as	21755pa	
0900	1000	11/ 03	Kenya, Kenya BC Corp	4935do				1000	1100		Kenya, Kenya BC Corp	4935do	1007003	21700pu	
0900	1000	vl	Lesotho, Radio	4800do				1000		vl	Lesotho, Radio	4800do			
0900	1000	vl	Liberia, ELWA	4760do				1000	1100	vl	Liberia, ELWA	4760do			
0900	1000	νl	Liberia, R Liberia International	6100do				1000	1100	vl	Liberia, R Liberia International	6100do			
0900	1000		Liberia, Voice of Hope	6280af				1000	1100		Liberia, Voice of Hope	11530af			
0900 0900	1000		Malaysia, Radio Namibia, Namibian BC Corp	7295do 7165af	7215af			1000	1100 1100		Malaysia, Radio Namibia, Namibian BC Corp	7295do 7165af	7215af		
0900	1000		New Zealand, R New Zealand Int	15175as	721301			1000	1100		Netherlands, Radio	7260va	9790va	12065va	
0900	1000		New Zealand, ZLXA	3935do	7290do			1000	1100		New Zealand, R New Zealand Int	15175as			
0900	1000	νl	Nigeria, Radio/Enugu	6025do				1000	1100		New Zealand, ZLXA	3935do			
0900	1000	vl	Nigeria, Radio/Ibadan	6050do	(000	70751	05701	1000	1100	vl	Nigeria, Radio/Enugu	6025do			
0900	1000	vl vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	1000	1100	vl 	Nigeria, Radio/Ibadan	6050do	40004-	70754-	05704-
0900 0900	1000	VI	Nigeria, Radio/Lagos Palau, KHBN/Voice of Hope	3326do 9955as	4990do 9965as	9985as	15725as	1000	1100 1100	vl vl	Nigeria, Radio/Kaduna Nigeria, Radio/Lagos	4770do 4990do	6090do 7285do	7275do	9570do
0900	1000	vl	Papua New Guinea, NBC	4890do	9675do	770303	1372303	1000	1100	vl	Nigeria, Voice of	7255af	15120af		
0900	1000		Sierra Leone, Sierra Leone BS	3316do				1000	1100		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15725as
0900	1000		Singapore R Corp of Singapore	6150do				1000	1100	vl	Papua New Guinea, NBC	4890do	9675do		
0900	1000	νl	Solomon Islands, SIBC	5020do				1000	1100		Seirra Leone, Sierra Leone BS	5980do			
0900	1000		Sri Lanka, Sri Lanka BC Corp	6130do	7110 J	7107.1		1000	1100	1	Singapore R Corp of Singapore	6150do			
0900 0900	1000	as	Uganda, Radio UK, BBC World Service	5026do 6190af	7110do 11940af	7196do		1000	1100 1100	vl	Solomon Islands, SIBC Uganda, Radio	5020do 5026do	7110do	7196do	
0900	1000	us	UK, Merlin Network One	6130eu	1174001				1100		UK, BBC World Service	6195va	9740as	11760me	11955pa
0900	1000		USA, Armed Forces Radio	4278va	4319va	4993va	5765va				12095eu	15310as	15360as	15485eu	15565eu
			6350va	6458va	6847va	10320va	10940va				15575as	17640eu	17760as	17790as	21470af
			12579va	12689va	13362va	16847va					21660as				
0900	1000		USA, KAIJ Dallas TX	5755va				1000		mtwhta	UK, BBC World Service	17885at	15400 (17000 (
0900 0900	1000		USA, KTBN Salt Lake City UT USA, KWHR Naalehu HI	7510na 11565pa	17780as			1000	1100 1100		UK, BBC World Service UK, BBC World Service	15190sa 6190af	15400af 11940af	17830af	
0900	1000		USA, Voice of America	11995as	13615as	15150as		1000	1100	u	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
0900	1000		USA, WEWN Birmingham AL	5825va	7425na						6350va	6458va	6847va	10320va	10940va
0900	1000		USA, WHRA Greenbush ME	7435af							12579va	12689va	13362va	16847va	
0900	1000		USA, WHRI Noblesville IN	7315sa				1000	1100		USA, KAIJ Dallas TX	5755va			
0900	1000		USA, WJCR Upton KY	7490va	13595as			1000	1100		USA, KTBN Salt Lake City UT	7510na	115/5		
0900 0900	1000 1000		USA, WMLK Bethel PA USA, WRMI Miami FL	7555va 7385am	9475alt			1000	1100 1100		USA, KWHR Naalehu HI USA, Voice of America	9930as 5985pa	11565pa 6165ca	7370ca	9590ca
0900	1000		USA, WSHB Cypress Crk SC	7535eu	9455sa			1000	1100		11720as	15250as	15425as	737000	7370cu
0900	1000		USA, WTJC Newport NC	9370na	, 10000			1000	1100		USA, WEWN Birmingham AL	5825na	7425na	7465na	
0900	1000		USA, WWCR Nashville TN	2390am	3210am	5070am	5935am	1000	1100		USA, WHRI Noblesville IN	6040na	9495sa		
0900	1000	νl	Vanuatu, Radio	3945do	4960do	7260do		1000	1100		USA, WJCR Upton KY	7490va	13595as		
0900	1000		Zambia, Christian Voice	9865do	/0/51			1000	1100		USA, WRMI Miami FL	9955am	0.455		
0900 0900	1000	vl vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp	6165do 5975do	6265do 6045do			1000	1100 1100		USA, WSHB Cypress Crk SC USA, WTJC Newport NC	6095am 9370na	9455sa		
0900	0930	S	Armenia, Voice of	4810eu	15270eu			1000	1100		USA, WYJC Newport NC	2390am	5070am	5935am	7435am
0915	1000	vl	Ghana, Ghana BC Corp	6130do	4915do			1000	1100		USA, WYFR Okeechobee FL	5950na	307 00111	3703diii	7 1000111
0915	1000	vl/as	Ghana, Ghana BC Corp	4915do	4915do			1000	1100	vl	Vanuatu, Radio	3945do	4960do	7260do	
0930	1000		Italy, Adventist World Radio	9660eu				1000	1100		Zambia, Christian Voice	9865do			
0930	1000		Netherlands, Radio	7260va	9790va	12065va		1000			Zambia, National BC Corp	6165do	6265do		
0930	1000		UK, BBC World Service	6195as	9740as	11760me	11955pa	1000	1100	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
			12095eu 15485eu	15190sa 15565eu	15310as 15575as	15360as 17640eu	15400af 17760as	10000 1015		mtwhf	Switzerland, Swiss R International Vatican City, Vatican Radio	9535eu 5883eu	9645eu	11740eu	15595eu
			17790as	17830af	17885af	21470af	21660as	1 1013	1000		21850eu	200060	70-1000	117 7000	. 55 / 560
			1777003	55541	50001			1030	1045	mtwhf	Ethiopia, Radio	5990do	7110do	9705do	
								1030	1100		Belgium, Radio Vlaanderen Intl	9865as			
								1030	1100 1100		Malaysia, RTM Sarawak Mongolia, Voice of	7160do 12085au			
								1030	1100		Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15120as	17850as
								1030	1100		UAE, Radio Dubai	13675eu	15370eu	15395eu	21605eu

Shortwave Guide

Frequencies .

•	- 40 -								• •			• • • •			
1100	1105		Pakistan, Radio	17525eu	21460eu			11100	1200		Sierra Leone, Sierra Leone BS	5980do			
1100	1120	fa	Kazakhstan, Radio Almaty	11840eu				1100	1200		Singapore, R Singapore Intl	6150as	9600as		
1100	1125		Netherlands, Radio	7260va	9790va	12065va		1100	1200		Switzerland, Swiss R International	9540as	21770as		
1100	1127		Vietnam, Voice of	7285as				1100	1200		Taiwan, Voice of Asia	7445as			
1100	1130		Australia, Radio	15240as				1100	1200		Uganda, Radio	5026do	7110do	7196do	
1100	1130	. 17	Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15210as	17850as	1100	1200	smtwhf	UK, BBC World Service	17885af			
1100 1100	1130 1130	mtwhf as	UK, BBC Caribbean Report UK, BBC World Service	6195ca 6195na	15220ca 15190sa	15220am		1100	1200	S	UK, BBC World Service	6190af	11940af		
1100	1200	us	Anguilla, Caribbean Beacon	11775am	1317080	132200111		1100	1200	as	UK, BBC World Service	5965na	6195va	9580as	9740as
1100	1200	vl	Australia, ABC/Alice Springs	2310do								11760me			
1100	1200	vl	Australia, ABC/Katherine	2485do				12095	eu	15220am	15280as	15310as	15400af	15485eu	15565eu
1100	1200	vl	Australia, ABC/Tennant Creek	2325do									17640eu	17700as	17830af
1100	1200		Australia, Radio	5995pa	6020va	9580va	12080pa					21470af			
			,	13605va	21820va			1100	1200	а	UK, Flat Earth Radio/Merlin	21455me			
1100	1200	vl	Botswana, Radio	7255do	9600do	7255do		1100		а	UK, Virgin Radio/Merlin	21455me	21515at		
1100	1200		Bulgaria, Radio	15700eu				1100	1200		Ukraine, R Ukraine International	15520eu	1010	1000	5775
1100	1200	vl	Cameroon, RTV/Yaounde	4850do				1100	1200		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
1100	1200		Canada, CFRX Toronto ON	6070do								6350va	6458va	6847va	10320va
1100	1200		Canada, CFVP Calgary AB	6030do								10940va	12579va	12689va	13362va
1100	1200		Canada, CHNX Halifax, NS	6130do				1100	1200		LICA Assess Essess Desite	16847va 4278va	4319va	4993va	5765va
1100	1200		Canada, CKZN St John's NF	6160do				1100	1200		USA, Armed Forces Radio	6350va	6458va	6847va	10320va
1100	1200		Canada, CKZU Vancouver BC	6160do								10940va	12579va		13362va
1100	1200		Costa Rica, R for Peace Intl	15048va	01015							16847va	1237710	1200710	1330210
1100	1200		Costa Rica, University Network		21815usb	01455		1100	1200		USA, KAIJ Dallas TX	5755va			
1100	1200		Ecuador, HCJB	12005am	ISIISVa	21455usb		1100	1200		USA, KTBN Salt Lake City UT	7510na			
1100 1100	1200 1200	mtwhf as/vl	Eqt Guinea, Radio Africa Eqt. Guinea, Radio East Africa	15185af 15185af				1100	1200		USA, KWHR Naalehu HI	9930as	11565pa		
1100	1200	a/monthly	Finland, Scandy Weekend Radio		1172000			1100	1200		USA, Voice of America	5985pa	6110as	9645as	9760as
1100	1200	u/illollilliy	Germany, Deutsche Welle	6140eu	15410af	17800af	21780af					11705as	11720as	15250as	15425as
1100	1200		Germany, Voice of Hope	21590me	1341001	1700001	2170001	1100	1200		USA, WEWN Birmingham AL	5825na	7425na	15745na	
1100	1200	vl	Ghana, Ghana BC Corp	6130do	4915do			1100	1200		USA, WHRI Noblesville IN	6040na	9495sa		
1100	1200	vl/as	Ghana, Ghana BC Corp	4915do	4915do			1100	1200		USA, WJCR Upton KY	7490va	13595as		
1100	1200		Guyana, Voice of	5949do				1100	1200		USA, WRMI Miami FL	9955am	11//0		
1100	1200		Iran, VOIRI	15185as	15385as	15585as	21470as	1100	1200		USA, WSHB Cypress Crk SC	6095am	11660va		
				21730as				1100	1200 1200		USA, WTJC Newport NC	9370na 2390am	F070	5935am	0.475
1100	1200	vl/as	Italy, IRRS	7120va				1100	1200		USA, WWCR Nashville TN USA, WYFR Okeechobee FL	5950na	5070am 11830na	3933am	9475am
1100	1200		Japan, Radio	6120na	9695as	15590as		1100		vl/s	Vanuatu, Radio	3945do	4960do	7260do	
1100	1200		Jordan, Radio	11690eu				1100	1200	VI/ 5	Zambia, Christian Voice	9865do	470000	720000	
1100	1200		Jordan, Radio	11690eu				1100		vl	Zambia, National BC Corp	6165do	6265do		
1100 1100	1200 1200		Kenya, Kenya BC Corp	4935do 4800do				1100		vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1100	1200	vl vl	Lesotho, Radio Liberia, ELWA	4760do				1110	1120		Greece, Voice of	9420eu	15630eu		
1100			Liberia, R Liberia International	6100do				1115	1145		Nepal, Radio	5005as	7165as		
1100	1200	VI	Liberia, Voice of Hope	11530af				1120	1140	W	Kazakhstan, Radio Almaty	9620eu	11840eu		
1100	1200		Malaysia, Radio	7295do					1135		Israel, Kol Israel	15640va	17545va		
1100	1200		Malaysia, TRM Sarawak	7160do					1156		Belgium, Radio Vlaanderen Intl	9925eu			
1100	1200		Namibia, Namibian BC Corp	7165af	7215af			1130	1157		Czech Rep, Radio Prague Intl	11640eu	21745as		
1100	1200		New Zealand, R New Zealand Int	15175as				1130	1200		Netherlands, Radio	6045eu	9855eu		
1100	1200		New Zealand, ZLXA	3935do				1130	1200		South Korea, R Korea Intl	9650na			
1100	1200		Nigeria, Radio/Enugu	6025do				1130 1130	1200 1200		Sri Lanka, Sri Lanka BC Corp	4940do			
1100	1200	vl	Nigeria, Radio/Ibadan	6050do				1130	1200	f u	UK, Wales Radio Intl/Merlin Vatican City, Vatican Radio	17625au 15595va	17515va		
1100	1200		Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	1140	1200	+	Kazakhstan, Radio Almaty	9620eu	11840eu		
1100	1200 1200	vl	Nigeria, Radio/Lagos	4990do	7285do 9965as	9985as	13840as		1200	vl	Libya, Voice of Africa	11815af			
1100 1100		vI.	Palau, KHBN/Voice of Hope	9955as 4890do	9965as 9675do	7700as	1384Uas		. 200						
1100	1200	VΙ	Papua New Guinea, NBC	407000	707300			1							

SELECTED PROGRAMS

BBC World Service (am)

1100 D World Briefing: 1120 D British News; 1130 S Arts in Action, M-F World Business Report, A World Business Review; 1145 M-A Sports Roundup. [Special service to the Caribbean on 6195 & 15220 kHz.: 1105 M-F Caribbean Report; 1110 M-F Caribbean Sport; 1115 M-F Caribbean Magazine.]

HCJB, Ecuador

1100 S Let My People Think, M-F Insight for Living, A Your Story Hour; 1128 M-F Money Minute; 1130 S The Living Word, M-F Morning in the Mountains (Christian break-fast show w/Bible Minute 1134, Scriptural Reading 1142, Beyond the Call 1148), A We Kids

Radio Australia

1100 D News; 1105 S Correspondents' Report, M-A Asia Pacific (regional current affairs); 1130 S In Conversation-Rural, M-F Regional Sports Report, A Fine Music Australia (classical); 1135 M-F Life Matters (personal and social issues).

Radio Japan

1100 D News; 1110 S Hello from Tokyo (listener contact), A Roundup Asia (regional magazine); 1115 M-F Asian Top News (headlines from region's radio); 1125 M Music Journey Around Japan, T Let's Try Japanese, W Unforgettable Music Masterpieces, H Brush Up Your Japanese, F Music Beat.

Radio Sweden

1130 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1145 M Sports Scan, T Media Scan (1st/3rd), W Money Matters, H Nordic Řeport (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/ The S-Files (things Swedish-4th), F Review of the Newsweek.

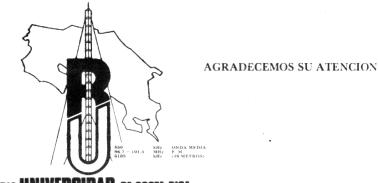
Radio New Zealand International

1100 D RNZ News; 1105 S Sunday Supplement (NZ opinions), M-F Late Edition (the day's news), A Deep Purple (relaxing music/nostalgia); 1125 S A Question of Religion.

WHRI, Indiana 6040 kHz.: 1100 M-F Music (Christian contemporary and gospel). 9495 kHz.: 1100 A Joe 2K; 1130 M-F Music (Christian contemporary and gospel), A DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: 1100 S Profiles; 1105 A This Week in Americana (antiques/collectibles). 15685 kHz.: 1100 T World of Radio, W Communications World, F The Big Backyard (Australian country music), A Profiles; 1110 A A View from Europe; 1115 A Eco Watch (ecology); 1130 A World of Radio



SAN JOSE COSTA RICA C. A.

Frequencies .

1200 1200 1200 1200	1205 1215 1220 1227	as	New Zealand, R New Zealand Int Somalia, Radio Galkayo UK, BBC World Service Iran, VOIRI	15175as 6985va 6190af 15185as 21730as	6195na 15385as	11940af 15585as	15220am 21470as	1200 1200 1200 1200 1200	1300 1300 1300 1300 1300	vl vl	Nigeria, Radio/Ibadan Nigeria, Radio/Kaduna Nigeria, Radio/Lagos Palau, KHBN/Voice of Hope Papua New Guinea, NBC	6050do 4770do 4990do 9955as 4890do	6090do 7285do 9965as 9675do	7275do 9985as	9570do 13840as
1200 1200 1200 1200 1200 1200 1200	1230 1230 1230 1230 1239 1245 1256		Philippines, FEBC Sri Lanka, Sri Lanka BC Corp Switzerland, Swiss R International Uzbekistan, Radio Tashkent Poland, Radio Polonia USA, WYFR Okeechobee FL China China Radio International	5060as 6095eu 5950na	5975as 7270eu 11830na 9730as 15415as	6025as 9525eu 11970na 9760pa	9715as 11820eu 11675pa	1200 1200 1200 1200 1200	1300 1300 1300 1300 1300		Sierra Leone, Sierra Leone BS Singapore, R Singapore Intl Taiwan, R Taiwan International Uganda, Radio UK, BBC World Service	5980do 6150as 7130as 5026do 5965na 9740as 15220am 15565eu	9600as 9610au 7110do 6195va 11760me 15280as 15575me	7196do 9515na 11955as 15310as 17640eu	9580as 12095eu 15485eu 17700as
1200 1200 1200	1256 1259 1300		Anguilla, Caribbean Beacon	3560va 11335va 6150as 11775am	9640va 13650va 11730as	9850va	9975va	1200 1200 1200	1300 1300 1300		UK, Flat Earth Radio/Merlin UK, Virgin Radio/Merlin USA, Armed Forces Radio	17830af 9430na 21455me 4278va	17885af 21515af 21515af 4319va	21470af 4993va	5765va
1200 1200 1200 1200	1300	vl vl vl	Australia, ABC/Alice Springs Australia, ABC/Katherine Australia, ABC/Tennant Creek Australia, Radio	2310do 2485do 2325do 5995pa 21820va	6020va	9580va	11650pa	1200 1200	1300 1300		USA, KAIJ Dallas TX USA, KTBN Salt Lake City UT	6350va 10940va 16847va 5755va 7510na	6458va 12579va	6847va 12689va	10320va 13362va
1200 1200 1200 1200	1300	vl vl	Botswana, Radio Brazil, Radio Nacional Bras Cameroon, RTV/Yaounde Canada, CBC Northern Service	7255do 15445am 4850do 9625do	9600do	7255do		1200 1200 1200	1300 1300 1300		USA, WEWN Birmingham AL	9930as 6110as 11715as 5825na	11565pa 9645as 15250as 7425na	9760as 15425as 15745na	11705as
1200 1200 1200 1200	1300 1300 1300 1300		Canada, CFRX Toronto ON Canada, CFRX Toronto ON Canada, CFVP Calgary AB Canada, CHNX Halifax, NS Canada, CKZN St John's NF	6070do 6030do 6130do 6160do				1200 1200 1200 1200 1200	1300 1300 1300 1300		USA, WHRI Noblesville IN USA, WJCR Upton KY USA, WRMI Miami FL USA, WSHB Cypress Crk SC	6040na 7490va 9955am 6095am	9495sa 13595as 11660va	107 10114	
1200 1200 1200 1200	1300 1300 1300 1300		Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl Costa Rica, University Network Ecuador, HCJB	15048irr 12005am	21815usb 21815usb 15115va	21455usb		1200 1200 1200 1200	1300 1300 1300 1300		USA, WTJC Newport NC USA, WWCR Nashville TN Vanuatu, Radio Zambia, Christian Voice	9370na 5070am 3945do 9865do	5935am 4960do	7435am 7260do	15685am
1200 1200 1200 1200	1300 1300 1300	as/vl a/monthly	Eqt. Guinea, Radio East Africa Finland, Scandv Weekend Radio France, R France International Germany, Deutsche Welle	15185af 11690va 11670af 6140eu	11720va 15155af	15195af	15540af	1200 1200 1204 1205 1215	1300 1300 1220 1300 1300	vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp UK, BBC Caribbean Report New Zealand, R New Zealand Int Egypt, Radio Cairo	6165do 5975do 6195ca 6095pa 17595as	6265do 6045do 15220ca		
1200 1200 1200 1200 1200	1300	vl vl/as	Germany, Voice of Hope Ghana, Ghana BC Corp Guyana, Voice of Italy, IRRS Jordan, Radio	15715me 4915do 5949do 7120va 11690eu	6130do			1213 1220 1230 1230 1230	1300 1300 1257 1300 1300		Caro UK, BBC World Service Vietnam, Voice of Austria, R Austria International Bangladesh, Bangla Betar	6190af 12019as 6155eu 7184as	11940af 13730eu 9558as		
1200 1200 1200 1200	1300 1300 1300	vl vl	Kenya, Kenya BC Corp Lesotho, Radio Liberia, ELWA Liberia, R Liberia International	4935do 4800do 4760do 6100do				1230 1230 1230 1230	1300 1300 1300		Germany, Overcomer Ministries Italy, Adventist World Radio Sri Lanka, Sri Lanka BC Corp	6110eu 17820eu 4940do 15425as	6005as	6075as	9770as
1200 1200 1200 1200	1300 1300 1300 1300	••	Liberia, Voice of Hope Malaysia, Radio Namibia, Namibian BC Corp Netherlands, Radio	11530af 7295do 7165af 6045eu	7215af 9855eu			1230 1230 1230 1245	1300 1300 1300 1300	a	Sweden, Radio Thailand, Radio Turkey, Voice of Seychelles, FEBA Radio	18960na 9810as 17690as 15535me	17815eu		
1200	1300 1300	vl	New Zealand, ZLXA Nigeria, Radio/Enugu	3935do 6025do	, 55566			1255		mtwhfa	Taiwan, CBS	6180as 11775as	7250as	9630as	11725as

SELECTED PROGRAMS

BBC World Service (am)

1200 D Newshour. [Special service to the Caribbean on 6195 & 15220 kHz.: 1205 M-F Caribbean Business; 1210 M-F Caribbean Report.]

HCJB, Ecuador

1200 S Hour of Decision, M-F Morning in the Mountains (cont'd. from 1130 w/Latin American & International News 1200 & 1230, Sports News 1205, Insights 1206, Mission Network News 1224, Church Doctor 1233, Guidelines for Living 1245, The Gospel Truth 1255), A Children's Bible Hour; 1230 S Words to Live By, A Adventures in Odvssev.

Radio Australia

1200 D News, 1205 S Country Club (country music), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Spirit of Things (spiritual matters).

Radio Canada International

1200 D News; 1210 S The Sunday Edition (arts/politics/ideas), M-F This Morning (magazine), A The House (Canadian politics).

Radio Sweden

1230 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc.
1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st
week)/Sweden Today (2nd/)Spectrum (arts magazine-3rdy)/Studio 49 (topical
discussion-4th); 1245 M Sports Scan, T Medio Scan (1st/3rd), W Money Matters,
H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The SFiles (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

6040 kHz.: 1200 A DXing with Cumbre; 1205 M-F Music (Christian contemporary and gospel). 15105 kHz.: 1205 M-F Music (Christian contemporary and gospel); 1230 S Joe 2K, A DXing with Cumbre.

WWCR. Tennessee

5070 kHz.: 1205 A Rock the Universe (Christian rock music).

15685 kHz.: **1245** M Eco Watch (ecology).

YLE Radio Finland

1230 S Capital Cafe (conversations), M-F Finland This Morning (magazine), A Finland This Week (review); **1245** A Starting Finnish (language course).



Shortwave Guide

Frequencies .

	,														
1300	1320		Brazil, Radio Nacional Bras	15445am				I 1300	1400		Sierra Leone, Sierra Leone BS	5980do			
1300	1325		Netherlands, Radio	6045eu	9855eu			1300	1400		Singapore, R Singapore Intl	6150as	9600as		
1300	1330		Egypt, Radio Cairo	17595as	,			1300	1400		South Korea, R Korea Intl	9570as	13670om		
1300	1330	s	Germany, Universal Life	9710eu	9955na			1300	1400		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as
1300	1330		Germnay, Voice of Hope	15715me							,	15425as			
1300	1330		Guam, Adventist World Radio	15225as				1300	1400		Uganda, Radio	4976do	5026do		
1300	1330		Turkey, Voice of	17690as	17815eu			1300	1400		UK, BBC World Service	5965na	5995as	6190af	6195va
1300	1356		China China Radio International	7405na	9570na	11675pa	11900pa				•	9515na	9590na	9740as	11760me
				11980as	15180as							11940af	12095eu	15220am	15310as
1300	1356		Romania, R Romania Internationa	111940eu	15290eu	15335na	17805na					15420af	15485eu	15565eu	15575me
1300	1400		Anguilla, Caribbean Beacon	11775am								17640eu	17700as	17830af	17885af
1300	1400	vl	Australia, ABC/Alice Springs	2310do								21470af			
1300	1400	vl	Australia, ABC/Katherine	2485do				1300	1400	а	UK, Flat Earth Radio/Merlin	9430na	21455me	21515af	
1300	1400	vl	Australia, ABC/Tennant Creek	2325do				1300	1400	а	UK, Virgin Radio/Merlin	21455me	21515af		
1300	1400		Australia, Radio	5995pa	6020va	9580va	11650pa	1300	1400		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
				21820va								6350va	6458va	6847va	10320va
1300	1400		Botswana, Radio	7255do	9600do	7255do						10940va	12579va	12689va	13362va
1300	1400	vl	Cameroon, RTV/Yaounde	4850do								16847va			
1300	1400		Canada, CBC Northern Service	9625do				1300	1400		USA, KAIJ Dallas TX	5755va			
1300	1400		Canada, CFRX Toronto ON	6070do				1300	1400		USA, KNLS Anchor Point AK	9615as			
1300	1400		Canada, CFVP Calgary AB	6030do				1300	1400		USA, KTBN Salt Lake City UT	7510na			
1300	1400		Canada, CHNX Halifax, NS	6130do				1300	1400		USA, KWHR Naalehu HI	9930as	11565pa		
1300	1400		Canada, CKZN St John's NF	6160do				1300	1400		USA, Voice of America	6110as	9645as	9760as	11705as
1300	1400		Canada, CKZU Vancouver BC	6160do								11715as	15425as		
1300	1400		Canada, R Canada International		13655na	17710na		1300	1400		USA, WEWN Birmingham AL	11875va	15375na	15745na	
1300	1400		Costa Rica, R for Peace Intl	15048va	21815usb			1300	1400		USA, WHRI Noblesville IN	6040na	15105na		
1300	1400		Costa Rica, University Network		21815usb	01/55		1300	1400		USA, WJCR Upton KY	7490va	13595as		
1300	1400	7.1	Ecuador, HCJB		15115va	21455usb		1300	1400		USA, WRMI Miami FL	15725am	0.455		
1300	1400		Eqt. Guinea, Radio East Africa	15185af	11700			1300	1400		USA, WSHB Cypress Crk SC	9430na	9455na		
1300	1400	a/monthly	Finland, Scandy Weekend Radio		11720va			1300	1400		USA, WTJC Newport NC	9370na	5935am	7.405	15/05
1300 1300	1400		Germany, Deutsche Welle	6140eu	13810af			1300	1400		USA, WWCR Nashville TN USA, WWFV McCaysville GA	5070am 12172va	3933am	7435am	15685am
1300	1400	vl	Germany, Overcomer Ministries Ghana, Ghana BC Corp	4915do	6130do			1300	1400	mtwhf	USA, WWFV McCaysville GA	9400va			
1300	1400	VI	Guyana, Voice of	5949do	013000			1300	1400	miwni	USA, WYFR Okeechobee FL	11550as	11740na	11830na	1107000
1300	1400	vl/as	Italy, IRRS	7120va				1300	1400		Zambia, Christian Voice	9865do	11/4UNG	1103000	11970na
1300	1400	VI/ US	Jordan, Radio	11690eu				1300	1400	vI.	Zambia, National BC Corp	6165do	6265do		
1300	1400		Kenya, Kenya BC Corp	4935do				1300	1400		Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1300	1400	vl	Lesotho, Radio	4800do				1306	1400		New Zealand, R New Zealand Int		004300		
1300	1400		Liberia, ELWA	4760do				1330	1357	occandi	Vietnam, Voice of	7145eu	9730eu		
1300	1400		Liberia, R Liberia International	6100do				1330	1359		Finland, YLE/R Finland	15400na			
1300	1400	*1	Liberia, Voice of Hope	11530af				1330	1400	c	Austria, R Austria International	6155eu	13730eu		
1300	1400		Malaysia, Radio	7295do				1330	1400	3	Germany, Voice of Hope	15715me			
1300	1400		Namibia, Namibian BC Corp	7165af	7215af			1330	1400		Guam, Adventist World Radio	11755as	11980as		
1300	1400		New Zealand, ZLXA	3935do				1330	1400		India, All India Radio	9690as	11620as	13710as	
1300	1400	vl	Nigeria, Radio/Enugu	6025do				1330	1400		Sweden, Radio	9425va	17505alt	17870va	18960va
1300	1400		Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	1330	1400		UAE, Radio Dubai	13630eu	13675eu	15395eu	21605eu
1300	1400		Nigeria, Radio/Lagos	4990do	7285do		· · · · · · ·	1330	1400		Uzbekistan, Radio Tashkent	5060as	5975as	6025as	9715as
1300	1400		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840as	1335	1350	f	Greece, Voice of	12105eu	15650as		
1300	1400	v	Papua New Guinea, NBC	4890do	9675do				1400		Vatican City, Vatican Radio		17515au		
1300	1400	as	S África, Channel África	11720af	17780af	21725af									

SELECTED PROGRAMS

BBC World Service (am)

1300 D News; 1305 S Jazzmatazz, M-F Outlook (magazine), A Global Business; 1330 S In Praise of God, A People & Politics; 1345 M-F Off the Shelf (book readings).

Channel Africa

1300 S/A Channel Africa Extra (weekend variety magazine).

China Radio Intenational

1300 D News; 1310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1320 S In the Spotlight (cultural magazine), A Listeners' Garden; 1330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (business), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

1300 S Renewing Your Mind, M-F Precept, A Toonzl; 1313 M-F Getting the Message; 1315 M-F Proclaim; 1330 S Mountain Meditations, M-F Family Life Today.

Radio Australia

1300 D News; 1305 S Country Club (cont'd. from 1205), A The Science Show; 1310 M-F Regional Sports Report; 1315 M-F The Planet (diverse music from around the

Radio Canada International

1300 D News; 1305 S The Sunday Edition (cont'd. from 1210), M-F This Morning (cont'd. from 1210), A Basic Black (humor).

Radio Sweden

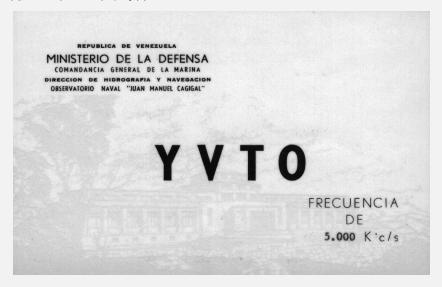
1330 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report) A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical dis-cussion-4th); 1345 M Sports Scan, T Media Scan (1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

6040 kHz.: **1307** S Music (Christian contemporary and gospel), 15105 kHz.: **1300** M-F World Harvest Live; **1315** S Music (Christian contemporary and gospel); **1345** A Music (Christian contemporary and gospel).

WWCR, Tennessee

15685 kHz.: 1315 A Ask WWCR (letters).



Frequencies .

1400	1405		Vatican City, Vatican Radio	15235au	17515au			I 1400	1500	vl	Nigeria, Radio/Lagos	4990do	7285do		
1400	1429		Czech Rep, Radio Prague Intl	21745va				1400	1500		Oman, Radio Sultanate of	15140va			
1400	1430		Jordan, Radio	11690eu				1400	1500		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840as
1400	1430		Mexico, R Mexico International	9705am	11770am			1400	1500		Russia, Voice of Russia WS	7180na	7315as	9800as	9875as
1400	1430		Thailand, Radio	9530as								11500as			
1400	1430	s	USA, Voice of America	18275va				1400	1500		Sierra Leone, Sierra Leone BS	5980do			
1400	1455	as	S Africa, Channel Africa	11720af	17780af	21725af		1400	1500		Singapore R Corp of Singapore	6150do			
1400	1456	40		7180as	7405na	9700as	11675as	1400	1500		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as
				11765as	13685af	15125af		1.00	.000		on zama, on zama so corp	15425as	000000	007000	,,,,,,,,,
1400	1500		Anguilla, Caribbean Beacon	11775am	.00000.	1012001		1400	1500		Switzerland, Swiss R International		15185as		
1400	1500	vl	Australia, ABC/Alice Springs	2310do				1400	1500		Taiwan, R Taiwan International	15125as	.0.0000		
1400	1500	vl	Australia, ABC/Katherine	2485do				1400	1500		Uganda, Radio	4976do	5026do		
1400	1500	vl	Australia, ABC/Tennant Creek	2325do					1500		UK, BBC World Service	5995as	6190af	6195as	9590na
1400	1500	••	Australia, Radio	5995as	6080pa	9580as	11650pa	1.00	.000		on, see mond connec	9740as	11940af	12095eu	15220na
	.000		, iourana, nadro	11660va	ососра	,00000	Посора					15310as	15485eu	15565eu	15575me
1400	1500	vl	Botswana, Radio	7255do	9600do	7255do							17700as		17840am
1400	1500	vl	Cameroon, RTV/Yaounde	4850do	700000	720000						21470af		1700001	170100111
1400	1500	*1	Canada, CBC Northern Service	9625do				1400	1500	a	UK, Flat Earth Radio/Merlin		21455me	21515af	
1400	1500		Canada, CFRX Toronto ON	6070do				1400	1500		UK, Virgin Radio/Merlin	21455me		2101001	
1400	1500		Canada, CFVP Calgary AB	6030do				1400	1500	ŭ	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
1400	1500		Canada, CHNX Halifax, NS	6130do				1 100	1000		ost, fillied Forces Radio	6350va	6458va	6847va	10320va
1400	1500		Canada, CKZN St John's NF	6160do								10940va	12579va	12689va	13362va
1400	1500		Canada, CKZU Vancouver BC	6160do								16847va	1207710	1200710	1000210
1400	1500			9640na	13655na	17710na		1400	1500		USA, KAIJ Dallas TX	13815va			
1400	1500		Costa Rica, R for Peace Intl		21815usb	17710110		1400	1500		USA, KJES Vado NM	11715na			
1400	1500		Costa Rica, University Network		21815usb			1400	1500		USA, KTBN Salt Lake City UT	7510na			
1400	1500		Ecuador, HCJB			21455usb		1400	1500		USA, KWHR Naalehu HI	9930as	11565as		
1400	1500	as/vl	Egt. Guinea, Radio East Africa	15185af	1011010	21100000		1400	1500		USA, Voice of America	6110as	7125as	9645as	9760as
1400	1500	a/monthly	Finland, Scandy Weekend Radio	11690va	11720va			1 100	1000		oort, voice of ranched	11705as	15205as	15395as	15425as
1400	1500	a, mommy	France, R France International	11610as	17620as	17680af		1400	1500		USA, WEWN Birmingham AL	11875va	15375na	15745na	10 12003
1400	1500		Germany, Deutsche Welle	6140eu	1702003	1700001		1400	1500		USA, WHRI Noblesville IN	6040na	15105na	107 10110	
1400	1500			6110eu	13810af			1400	1500		USA, WJCR Upton KY	7490va	13595as		
1400	1500		Germany, Voice of Hope	15715me				1400	1500		USA, WRMI Miami FL	15725am	1007003		
1400	1500	vl	Ghana, Ghana BC Corp	4915do	6130do			1400	1500		USA, WTJC Newport NC	9370na			
1400	1500	V1	Guyana, Voice of	5949do	013000			1400	1500		USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1400	1500		India, All India Radio	9690as	11620as	13710as		1400	1500		USA, WWFV McCaysville GA	12172am	121000111	100400111	130034111
1400	1500	vl/as	Italy, IRRS	7120va	1102003	1071003		1400		mtwhf	USA, WWFV McCaysville GA	9400va			
1400	1500	VI/ U3	Japan, Radio	7200as	9505as	9845as	11880va	1400	1500	IIIIWIII	USA, WYFR Okeechobee FL	11550as	11740na	11830na	17760na
1400	1500		Kenya, Kenya BC Corp	4935do	750503	704303	1100044	1400	1500		Zambia, Christian Voice	9865do	11740110	11000110	17700110
1400	1500	vl	Lesotho, Radio	4800do				1400	1500	vl	Zambia, National BC Corp	6165do	6265do		
1400	1500	vl	Liberia, ELWA	4760do				1400	1500		Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1400	1500	vl	Liberia, R Liberia International	6100do				1415	1420	VI	Nepal, Radio	5005as	7165as		
1400	1500	*1	Liberia, Voice of Hope	11530af				1430	1500		Austria, R Austria International	6155eu	13730eu	17855au	
1400	1500		Malaysia, Radio	7295do				1430	1500		Guam, Adventist World Radio	15225as	1070000	1700000	
1400	1500		Malaysia, RTM Sarawak	7160do				1430	1500		Guam, Trans World Radio	15330as			
1400	1500			7165af	7215af			1430	1500		Jordan, Radio	17680na			
1400	1500	occsnal	New Zealand, R New Zealand Int		721301			1430	1500		Malaysia, RTM Kota Kinabalu	5980do			
1400	1500	occanui	New Zealand, K New Zealand IIII	3935do				1430	1500		Myanmar, Radio	5985do			
1400		vl	Nigeria, Radio/Enugu	6025do				1430	1500		Netherlands, Radio	12070as	12090as	15595as	
1400	1500	vl	Nigeria, Radio/Ibadan	6050do				1430	1500		Sweden, Radio	17505va	18960na	.557543	
1400	1500		Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	1445	1500	f	Seychelles, FEBA Radio	11600as	. 5700114		
				, 000	23,000	, 000		,			22,22				

SELECTED PROGRAMS

BBC World Service (am)

1400 D News; 1405 S Talking Point (global phone-in), M Meridian-Ideas, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Meridian-Masterpiece, A Sportsworld (live action); 1430 M Music Mix, T UK Top Twenty, W/F Westway (drama serial), H World of Music; 1445 W UK Album Chart, F Music X-Press.

Channel Africa

1300 S/A Channel Africa Extra (cont'd from 1200).

China Radio Intenational

1400 D News; 1410 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1420 S In the Spotlight (cultural magazine), A Listeners' Garden; 1430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (business), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

1400 S Back to God Hour, M-F Turning Point, A Kid's Corner; 1430 S Moody Presents, M-F The Living Way, A Rock Solid; 1456 M-F Beyond the Call.

Radio Australia

1400 D News; 1405 S Books and Writing, M-F The Planet (cont'd. from 1315), A New Dimensions ("progressive" ideas).

Radio Canada International

1400 D News; 1405 S The Sunday Edition (cont'd. from 1210), M-F This Morning (cont'd. from 1210), A Basic Black (humor); 1430 F C'est La Vie (life in French Canada); 1445 M-H Out Front (experimental radio).

Radio Japan 1400 D News; 1410 S Roundup Asia (regional magazine), A Weekend Square (Japanese life); 1415 M-F 44 Minutes (feature magazine).

Voice of Russia

1400 D News; 1411 S Sunday Panorama, M-A News & Views; 1424 S Russia: People and Events; 1430 D News in Brief; 1432 S Kaleidoscope (Russian events), M Folk Box, T/H Music Around Us, W Jazz Show, F Moscow Yesterday & Today, A Timelines; 1446 T/ H Music At Your Request.

WHRI, Indiana

6040 kHz.: 1400 M-F World Harvest Live; 1430 S/A DXing with Cumbre. 15105 kHz.: 1405 M-F Music (Christian contemporary and gospel); 1430 S Music (Christian contemporary and gospel),



Shortwave Guide

Frequencies

1500	1530	Ecuador, HCJB	21455usb				1500	1600		Nigeria, Radio/Lagos	4990do	7285do		
1500	1530	Germany, Voice of Hope		17550as			1500	1600		Nigeria, Voice of	7255af	15120af		
1500	1530	Mexico, R Mexico International	9705am	11770am			1500	1600		Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840as
1500	1530	Mongolia, Voice of	12015as	12085as			1500	1600	1	Russia, Voice of Russia WS	4940me	4965me	4975me	6005me
1500	1530	S Africa, Channel Africa	17770af								7180as	7305as	9830me	
1500	1556	China China Radio Internationa		7405na	9785as	13685af	1500	1600		S Africa, World Beacon	6145af			
			15125af	17720af			1500	1600	l	Sierra Leone, Sierra Leone BS	5980do			
1500	1556	North Korea, Voice of Korea	4405va	6574na	9335na	11710na	1500	1600	l	Singapore R Corp of Singapore	6150do			
			13760na				1500	1600	l	Sri Lanka, Sri Lanka BC Čorp	4940do	6005as	6075as	9770as
1500	1559	Canada, R Canada Internationa	l 9640na	13655na	15360na	17710na					15425as			
			17820na				1500	1600	l	Uganda, Radio	4976do	5026do		
1500	1600	Anguilla, Caribbean Beacon	11775am				1500	1600	l	UK, BBC World Service	5975as	5995as	6190af	6195as
1500	1600 vl	Australia, ABC/Alice Springs	2310do								9410eu	9515na	9590na	9740as
1500	1600 vl	Australia, ABC/Katherine	2485do								11860af	11940af	12095eu	15220na
1500	1600 vl	Australia, ABC/Tennant Creek	2325do								15310as	15400af	15420af	15485eu
1500	1600	Australia, Radio	5995va	6080pa	9580as	11650pa					15565eu	17700as	17830af	17840am
			11660va			'					21470af	21490af	21660af	
1500	1600 vl	Botswana, Radio	7255do	9600do	7255do		1500	1600	а	UK, Flat Earth Radio/Merlin	15665na	21455me	21515af	
1500	1600 vl	Cameroon, RTV/Yaounde	4850do				1500	1600	a	UK, Virgin Radio/Merlin	21455me	21515af		
1500	1600	Canada, CBC Northern Service	9625do				1500	1600		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
1500	1600	Canada, CFRX Toronto ON	6070do							,	6350va	6458va	6847va	10320va
1500	1600	Canada, CFVP Calgary AB	6030do								10940va	12579va	12689va	13362va
1500	1600	Canada, CHNX Halifax, NS	6130do								16847va			
1500	1600	Canada, CKZN St John's NF	6160do				1500	1600	ı	USA, KAIJ Dallas TX	13815va			
1500	1600	Canada, CKZU Vancouver BC	6160do				1500	1600		USA, KJES Vado NM	11715na			
1500	1600	Costa Rica, R for Peace Intl	15048va	21815usb			1500	1600		USA, KTBN Salt Lake City UT	7510na			
1500	1600	Costa Rica, University Network					1500	1600		USA, KWHR Naalehu HI	9930as	11565pa		
1500	1600	Ecuador, HCJB		15115va			1500	1600		USA, VOA Special English	6110as	9760as	9845as	12040as
1500	1600 as/vl	Eqt. Guinea, Radio East Africa	15185af				1000			our y rom opocial English	15460as	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	701000	1201000
1500	1600 a/mon			11720va			1500	1600	1	USA, Voice of America	7125as	9575as	9645as	15205as
1500	1600	Germany, Deutsche Welle	6140eu	,20.0			1000			our y roles of runoffed	15395as	,0,000	70.000	1020000
1500	1600	Germany, Overcomer Ministries		13810af			1500	1600	ı	USA, WEWN Birmingham AL	11875va	15375na	15745na	
1500	1600 vl	Ghana, Ghana BC Corp	4915do	6130do			1500	1600		USA, WHRI Noblesville IN	6040na	15105na	107 10114	
1500	1600	Guam, Trans World Radio	15330as	010000			1500	1600		USA, WJCR Upton KY	7490va	13595as		
1500	1600	Guyana, Voice of	5949do				1500	1600		USA, WRMI Miami FL	15725am	1007003		
1500	1600 vl/as	Italy, IRRS	7120va				1500	1600		USA, WTJC Newport NC	9370na			
1500	1600	Japan, Radio	7200as	9750as	9845as		1500	1600		USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1500	1600	Jordan, Radio	17680na	// Jous	704303		1500	1600		USA, WWFV McCaysville GA	12172am	121000111	100404111	130030111
1500	1600	Kenya, Kenya BC Corp	4935do				1500	1600		USA, WWFV McCaysville GA	9400va			
1500	1600 vl	Lesotho, Radio	4800do				1500	1600		USA, WYFR Okeechobee FL	11830na	17750na	17760na	
1500	1600 vl	Liberia, ELWA	4760do				1500	1600		Zambia, Christian Voice	4965do	17730110	17700110	
1500	1600 vl	Liberia, R Liberia International	6100do				1500	1600		Zambia, National BC Corp	6165do	6265do		
1500	1600 VI	Liberia, Voice of Hope	11530af				1500	1600		Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1500	1600	Malaysia, Radio	7295do				1515	1600		Malawi, Malawi BC Corp	3380do	004300		
1500	1600	Malaysia, RTM Kota Kinabalu	5980do				1530	1545		Afghanistan, Voice of Shari'ah	7002do	7073do	7083as	
1500	1600	Malaysia, RTM Sarawak	7160do				1530	1545		Bangladesh, Bangla Betar	4882as	15520as	700308	
1500	1600		5985do				1530	1545			11600as	1332008		
1500	1600	Myanmar, Radio Namibia, Namibian BC Corp	7165af	7015-4			1530	1600		Seychelles, FEBA Radio	3356do	4820do	7255do	
1500	1600		12070as	7215af 12095as	15595as		1530	1600		Botswana, Radio Germany, Voice of Hope	15715me	402000	/23300	
		Netherlands, Radio		1209308	1339308							0/25	11775	
1500	1600 occsno	New Zealand, R New Zealand In					1530	1600		Iran, VOIRI	7115as	9635as	11775na	
1500	1600	New Zealand, ZLXA	3935do				1530	1600		Slovakia, Adventist World Radio	13860as	15500-		
1500	1600 vl	Nigeria, Radio/Enugu	6025do				1545	1600		Bangladesh, Bangla Betar	4882as	15520as		
1500	1600 vl	Nigeria, Radio/Ibadan	6050do	4000-1-	70751	05704-	1545	1600		Seychelles, FEBA Radio	11600as	127/5-	15005.	
1500	1600 vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	1550	1600	1	Vatican City, Vatican Radio	9865au	13765au	15235au	

SELECTED PROGRAMS

BBC World Service

1500 D News, 1505 S Concert Hall, M One Planet (ecology), T Discovery (science), W Health Matters, H Science View, F Sports International, A Sportsworld (live action); 1530 M People & Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World (BBC's best).

China Radio Intenational

1500 D News, 1510 S Report on Developing Countries, M-F Current Affairs, A Global Review, 1520 S In the Spotlight (cultural magazine), A Listeners' Gorden; 1530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (business), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

1500 S Encounter, M-F Haven, A Rock Solid (cont'd. from 1430); 1530 S The Discipleship Hour, M-F Back to the Bible, A Let My People Think; 1555 M-F Joni and Friends.

Radio Australia

1500 D News; 1505 S Encounter (religion in Australia), M-F Asia Pacific (regional current affairs), A Melisma (innovative music); 1530 M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor.

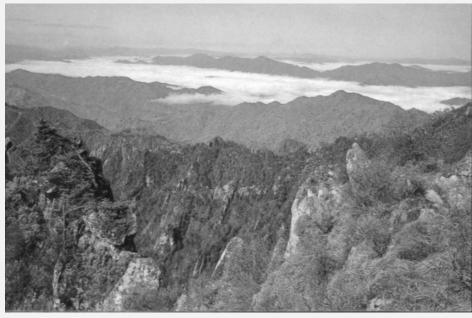
Radio Austria International

1530 D Report from Austria (magazine); 1535 S Radio E, A Week in Review; 1550 A

WHRI, Indiana

13760 kHz.: 1505 S World Harvest Country Style; M-F Music (Christian contemporary and gospel); 1530 S/A DXing with Cumbre.

15105 kHz.: 1500 S DXing with Cumbre; 1502 A 20 The Countdown Magazine (Christian rock music charts); 1505 M-F Music (Christian contemporary and gospel).
17650 kHz.: 1505 M-F Music (Christian contemporary and gospel); 1515 S Music (Christian contemporary and gospel); 1515 S Music (Christian contemporary and gospel); 1515 S Music (Christian contemporary and gospel); 1516 S Music (Christian cont tian contemporary and gospel).



Radio Pyongyang North Korea 1998

Frequencies .

1600 1600	1610 1615		Vatican City, Vatican Radio Pakistan, Radio	9865au 11570va	13765au 15100va	15235au 15725va	17720va	1600	1700 1700		Nigeria, Radio/Lagos Nigeria, Voice of	3326do 7255af	4990do 15120af		
1600 1600	1625 1627		Netherlands, Radio Iran, VOIRI	12070as 7115as	12095as 9635as	15595as 11775na		1600 1600	1700 1700		Paľau, KHBN/Voice of Hope Russia, Voice of Russia WS	9955as 7180me	9965as 9830me	13840as	
1600 1600 1600	1627 1630 1630	s	Vietnam, Voice of Ecuador, HCJB Germany, Universal Life	15105af	9730eu 15115va	21455usb		1600 1600 1600	1700 1700 1700		S Africa, World Beacon Sierra Leone, Sierra Leone BS South Korea, R Korea Intl	6145af 5980do 5975	om	9515va	9870va
1600 1600	1630 1630		Guam, Trans World Radio Jordan, Radio	15330as 17860na				1600 1600	1700 1700		Sri Lanka, Sri Lanka BC Corp Uganda, Radio	4940do 4976do	5026do		
1600 1600 1600 1600	1630 1630 1640 1645	vl	S Africa, Channel Africa Zimbabwe, Zimbabwe BC Corp UAE, Radio Dubai Germany, Deutsche Welle	9525af 5975do 13675eu 6170as	6045do 15395eu 7225as	21605eu 9735af	15380as	1600	1700		UK, BBC World Service	3915as 7160as 12095eu 15565eu	5975as 9410eu 15210af 17700as	6190af 9740eu 15310as 17830af	6195as 11940af 15420af 16740am
1600	1650	occsnal	New Zealand, R New Zealand Int		17810as	21780af		1600	1700	mtwhfa	UK, BBC World Service	21470af 9515na	21660af		
1600 1600	1656 1656		China China Radio International North Korea, Voice of Korea	7190af 3560va	13650af 6520va	9660va	9975va	1600 1600	1700	а	UK, Flat Earth Radio/Merlin UK, World Beacon	15525eu 15455eu	15665na	21515af	
1600 1600 1600	1700 1700 1700	vl	Algeria, R Algiers International Anguilla, Caribbean Beacon Australia, ABC/Alice Springs	11715va 11775am 2310do	15160va			1600	1700		USA, Armed Forces Radio	4278va 6350va 10940va	4319va 6458va 12579va	4993va 6847va 12689va	5765va 10320va 13362va
1600 1600	1700	vl vl	Australia, ABC/Katherine Australia, ABC/Tennant Creek	2485do 2325do				1600	1700		USA, KAIJ Dallas TX	16847va 13815va			
1600	1700		Australia, Radio	5995va 11650pa	6080pa 11660va	9580va	9655va	1600 1600	1700 1700		USA, KJES Vado NM USA, KTBN Salt Lake City UT	11715na 15590na			
1600 1600	1700 1700	vl vl	Botswana, Radio Cameroon, RTV/Yaounde	3356do 4850do	4820do	7255do		1600 1600	1700 1700		USA, KWHR Naalehu HI USA, VOA Special English	9930as 13600af	15445af	17895af	
1600 1600	1700 1700		Canada, CBC Northern Service Canada, CFRX Toronto ON	9625do 6070do				1600	1700		USA, Voice of America	6035af 9645as	6110as 9760as	7125as 11920af	9575as 12040af
1600	1700		Canada, CFVP Calgary AB Canada, CHNX Halifax, NS	6030do 6130do				1/00	1700		LICA WEWALD: AL	13710af 15395as	15205as	15225af	15240af
1600 1600 1600	1700 1700 1700		Canada, CKZN St John's NF Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl	6160do 6160do 15048va	21815usb			1600 1600 1600	1700 1700 1700		USA, WEWN Birmingham AL USA, WHRA Greenbush ME USA, WHRI Noblesville IN	11875na 17650af 13760na	13615na 15105na	15375na	13/43na
1600 1600	1700 1700 1700		Costa Rica, University Network Ethiopia, Radio	15048va 7165af	21815usb 9560af			1600	1700 1700 1700		USA, WINB Red Lion PA USA, WJCR Upton KY	13570eu 7490va	13595as		
1600	1700 1700	a/monthly		11690va 11615af	11720va 11995af	12015af	15210af	1600	1700 1700		USA, WRMI Miami FL USA, WSHB Cypress Crk SC	15725am 18910af	1007003		
1600	1700		Germany, Deutsche Welle	17850af 6140eu				1600 1600	1700 1700		USA, WTJC Newport NC USA, WWCR Nashville TN	9370na 9475am	12160am	13845am	15685am
1600 1600	1700 1700	а	Germany, Good News World R Germany, Overcomer Ministries	15105af 6110eu	13810af			1600 1600		mtwhf	USA, WWFV McCaysville GA USA, WWFV McCaysville GA	12172am 9400va			
1600 1600	1700 1700	vl	Ghana, Ghana BC Corp Guam, Adventist World Radio	4915do 11980as	6130do			1600	1700		USA, WYFR Okeechobee FL	11830na 21455eu	15215na 21525af	17760na	18980eu
1600	1700 1700	17	Guyana, Voice of Israel, Kol Israel	5949do 11605va	17545va			1600	1700 1700		Zambia, Christian Voice Zambia, National BC Corp	4965do 6165do	6265do		
1600 1600 1600	1700 1700 1700	vl/as vl	Italy, IRRS Kenya, Kenya BC Corp Lesotho, Radio	7120va 4935do 4800do				1615 1615	1630 1630	as	UK, BBC World Service Vatican City, Vatican Radio	11860af 4005eu 15595eu	21490af 5883eu	7250eu	9645eu
1600 1600	1700 1700 1700	vl vl	Liberia, ELWA Liberia, R Liberia International	4760do 6100do				1625 1630	1640 1700		Monaco, Trans World Radio Egypt, Radio Cairo	6145me 15255af			
1600	1700 1700	vl	Liberia, Voice of Hope Malawi, Malawi BC Corp	11530af 3380do				1630 1630	1700 1700	s	Seychelles, FEBA Radio Slovakia, R Slovakia International	11605as	6055eu	7345eu	
1600 1600	1700 1700		Malaysia, Radio Namibia, Namibian BC Corp	7295do 7165af	7215af			1630 1630	1700	mtwhf	Somalia, Radio Galkayo UK, Merlin Network One	6985va 12065as			
1600 1600	1700 1700	vl	New Zealand, ZLXA Nigeria, Radio/Enugu	3935do 6025do				1630 1645	1700 1700	vl	Zimbabwe, Zimbabwe BC Corp Bangladesh, Bangla Betar	4828do 7184eu	6045do 7462eu	9550eu	15520eu
1600 1600	1700 1700	vl vl	Nigeria, Radio/Ibadan Nigeria, Radio/Kaduna	6050do 4770do	6090do	7275do	9570do	1650	1700		New Zealand, R New Zealand Int	15120pa			

SELECTED PROGRAMS

BBC World Service (am) 1600 S/A News, M-F Europe Today; 1605 S/A Sportsworld (live action); 1630 M-F World Business Report; 1645 M-F Sports Roundup.

HCJB, Ecuador

1600 S Message of Truth, M-F Renewing Your Mind, A Words of Hope.

Radio Australia
1600 D News; 1605 S The National Interest (Australian politics), M Margaret Throsby
(interview and music), T The Comfort Zone (Australian homes/gardens/food), W Verbatim (oral histories), H Hindsight (Australian history), F AWAYE! (Aboriginal culture), A Melisma (cont'd. from 1505); **1630** W Earshot (Australian voices).

WHRI, Indiana

13760 kHz.: **1615** S Music (Christian contemporary and gospel). 15105 kHz.: **1600** A 20 The Countdown Magazine (Christian rock music charts); **1605** S-F Music (Christian contemporary and gospel).

17650 kHz.: **1600** A Music (Christian contemporary and gospel).

WWCR, Tennessee

12060 kHz.: **1630** A Keen on Jazz. 15685 kHz.: **1600** M-F World Wide Country Radio (country music).



YLE Radio Finland 1999

1700 UTC

1:00 PM EDT 12:00 PM CDT 10:00 AM PDT

Shortwave Guide

2:00 PM EDT 1:00 PM CDT 11:00 AM PDT 1800 UTC

1 1	LWUL	:NCIE2						•••	• •			• • •	• • • •	• • •	
1700 1700	1727 1727		Czech Rep, Radio Prague Intl Vietnam, Voice of	5930eu 12070eu	17485af			1800	1815		S Africa, Radio Lufonia	7155af			
1700	1730		France, R France International	11615af	15210af			1800 1800	1827 1827		Czech Rep, Radio Prague Intl Vietnam, Voice of	5930eu 7440eu	7315va 9730eu		
1700 1700	1730 1730		Germany, Overcomer Ministries S Africa, Channel Africa	6110eu 17870af				1800 1800	1830 1830		Egypt, Radio Cairo S Africa, Adventist World Radio	15255af 5960af	6100af		
1700 1700	1730 1730	a mtwhf	UK, Flat Earth Radio/Merlin UK, Merlin Network One	15525eu 12065as	15665na	21515af		1800	1830		S Africa, Channel Africa	17870af			
1700	1756		China China Radio International 9795af	7150af 11910af	9570af	9670af	9695af	1800	1830		UK, BBC World Service 9410eu	3255af 9510as	5975as 9740pa	6190af 15400af	6195eu 15420af
1700	1756		Romania, R Romania International	9625eu	11740eu	11940eu	15365eu	1800	1830		15575me UK, RTE Radio	17830af 9895me	17840na	21470af	
1700 1700	1759 1800		Poland, Radio Polonia Anguilla, Caribbean Beacon Australia, ABC/Alice Springs	5995eu 11775am	7285eu			1800	1859		Canada, R Canada International	11720af	13640af		
1700 1700	1800 1800	vl vl	Australia, ABC/Alice Springs Australia, ABC/Katherine	2310do 2485do				1800 1800	1900 1900	mtwhf	Anguilla, Caribbean Beacon Argentina, RAE	11775am 15345eu			
1700 1700	1800 1800	vl	Australia, ABC/Tennant Creek Australia, Radio	2325do 5995va	6080pa	9580va	9655va	1800 1800	1900 1900	vl vl	Australia, ABC/Alice Springs Australia, ABC/Katherine	2310do 2485do			
			9815as	11880va				1800	1900	vl	Australia, ABC/Tennant Creek	2325do	==		
1700 1700	1800 1800	vl	Bangladesh, Bangla Betar Botswana, Radio	7184eu 3356do	7462eu 4820do	9550eu 7255do	15520eu	1800	1900		Australia, Radio 9815as	6080as 11880va	7240pa	9580va	9655va
1700 1700	1800 1800	vl	Cameroon, RTV/Yaounde Canada, CBC Northern Service	4850do 9625do				1800 1800	1900 1900	vl vl	Botswana, Radio Cameroon, RTV/Yaounde	3356do 4850do	4820do		
1700 1700	1800 1800		Canada, CFRX Toronto ON Canada, CFVP Calgary AB	6070do 6030do				1800	1900	VI	Canada, CBC Northern Service	9625do			
1700 1700	1800 1800		Canada, CHNX Halifax, NS Canada, CKZN St John's NF	6130do 6160do				1800 1800	1900 1900		Canada, CFRX Toronto ON Canada, CFVP Calgary AB	6070do 6030do			
1700 1700	1800 1800		Canada, CKZU Vancouver BC	6160do 15048va	21815usb			1800 1800	1900 1900		Canada, CHNX Halifax, NS Canada, CKZN St John's NF	6130do 6160do			
1700	1800		Costa Rica, R for Peace Intl Costa Rica, University Network	15048va	21815usb			1800	1900		Canada, CKZU Vancouver BC	6160do	01015		
1700 1700	1800 1800	mtwhf	Egypt, Radio Cairo Eqt Guinea, Radio Africa	15255af 15185af				1800 1800	1900 1900		Costa Rica, R for Peace Intl Costa Rica, University Network	15048va 15048va	21815usb 21815usb		
1700 1700	1800 1800	a/monthly	Finland, Scandv Weekend Radio Germany, Deutsche Welle	11690va 6140eu	11720va			1800 1800	1900 1900	mtwhf a/monthly	Eqt Guinea, Radio Africa Finland, Scandv Weekend Radio	15185af 11690va	11720va		
1700 1700	1800 1800	а	Germany, Good News World R Germany, Voice of Hope	11795me				1800	1900	-,,	Germnay, Unt Methodist Church	13810af	15485af		
1700	1800		Germany. Unt Methodist Church	9495me 13810af	15485af			1800 1800	1900 1900	vl	Germnay, Voice of Hope Ghana, Ghana BC Corp	9495va 3366do	11735af 4915do		
1700 1700	1800 1800	vl a	Ghana, Ghana BC Corp Greece, Voice of	3366do 7455na	4915do 9420eu			1800 1800	1900 1900		Guyana, Voice of India, All India Radio	5949do 7410as	9950as	11620as	11935as
1700 1700	1800 1800		Guyana, Voice of Japan, Radio	5949do 9505na	11970eu	15355af					13790af	15200af	17670af	1102000	1170000
1700 1700	1800 1800	ul	Kenya, Kenya BC Corp Lesotho, Radio	4935do 4800do				1800 1800	1900 1900	vl	Italy, IRRS Kenya, Kenya BC Corp	3985va 4935do			
1700	1800	vl	Liberia, ELWA	4760do				1800 1800	1900 1900	vl	Kuwait, Radio Lesotho, Radio	11990va 4800do			
1700 1700	1800 1800	vl	Liberia, R Liberia International Liberia, Voice of Hope	6100do 11530af				1800 1800	1900	vl vl	Liberia, ELWA	4760do			
1700 1700	1800 1800	vl	Malawi, Malawi BC Corp Malaysia, Radio	3380do 7295do				1800	1900 1900		Liberia, R Liberia International Liberia, Voice of Hope	5100do 11530af			
1700 1700	1800 1800		Namibia, Namibian BC Corp	3270af 15120pa	3289af			1800 1800	1900 1900	vl	Malawi, Malawi BC Corp Malaysia, Radio	3380do 7295do			
1700	1800		New Zealand, R New Zealand Int New Zealand, ZLXA	3935do				1800 1800	1900 1900		Namibia, Namibian BC Corp Netherlands, Radio	3270af 6020af	3289af 11655af		
1700 1700	1800 1800	vl vl	Nigeria, Radio/Enugu Nigeria, Radio/Ibadan	6025do 6050do				1800	1900		New Zealand, R New Zealand Int	15120pa	1100001		
1700 1700	1800 1800	vl vl	Nigeria, Radio/Kaduna Nigeria, Radio/Lagos	4770do 3326do	6090do 4990do	7275do	9570do	1800 1800	1900 1900	vl	New Zealand, ZLXA Nigeria, Radio/Enugu	3935do 6025do			
1700 1700	1800 1800	as	Palau, KHBN/Voice of Hope Russia, Voice of Russia WS	9955as 5940eu	9965as 6045eu	13840as 7180eu		1800	1900	vİ	Nigeria, Radio/Ibadan	6050do	/000 I	7075	05701
1700	1800	us	Russia, Voice of Russia WS	7340eu	9775eu	9830af	9890eu	1800 1800	1900 1900	vl vl	Nigeria, Radio/Kaduna Nigeria, Radio/Lagos	4770do 3326do	6090do 4990do	7275do	9570do
1700	1800		S Africa, World Beacon	6145af				1800 1800	1900 1900		Palau, KHBN/Voice of Hope Philippines, Radyo Pilipinas	9965as 11720me	13840as 15190me	17720me	
1700 1700	1800 1800	irreg	Sierra Leone, Sierra Leone BS Sri Lanka, Sri Lanka BC Corp	5980do 4940do				1800	1900		Russia, Voice of Russia WS	5940eu	5950eu	6045eu	7205eu
1700 1700	1800 1800	vl	Sudan, Radio Omdurman Uganda, Radio	7199do 4976do	9200do 5026do	9505do		1800	1900	m	7340eu S Africa, Amateur Radio League	9775eu 3215af	9875af	9890eu	11510af
1700	1800		UK, BBC World Service	3255af	3915as	5975as	6005af	1800 1800	1900 1900		S Africa, World Beacon Sierra Leone, Sierra Leone BS	3230af 5980do	11640af		
			6190af 9630af	6195eu 9740as	7160as 15400af	9410eu 15420af	9510as 15575me	1800	1900	irreg	Sri Lanka, Sri Lanka BC Corp	4940do	9500af		
1700	1800		UK, World Beacon	17840na 15455eu	21470af			1800 1800	1900 1900		Swaziland, Trans World Radio Taiwan, R Taiwan International	3200af 3955eu			
1700	1800		USA, Armed Forces Radio 6350va	4278va 6458va	4319va 6847va	4993va 10320va	5765va 10940va	1800 1800	1900 1900	mtwhf	Uganda, Radio UK, Merlin Network One	4976do 6130af	5026do 12065as		
1700	1800		USA, KAIJ Dallas TX	12689va 13815va	13362va	16847va		1800 1800	1900 1900		UK, World Beacon USA, Armed Forces Radio	15585af 4278va	17665af 4319va	4993va	5765va
1700	1800		USA, KTBN Salt Lake City UT	15590na				1800	1700		6350va	6458va	6847va	10320va	10940va
1700 1700	1800 1800		USA, KWHR Naalehu HI USA, Voice of America	9930as 6040af	6110as	7125as	9645as	1800	1900		USA, KAIJ Dallas TX	12689va 13815va	13362va	16847va	
			9760as 15395as	11920af 15455af	12040af 17895af	15205as	15240af	1800 1800	1900 1900		USA, KTBN Salt Lake City UT USA, KWHR Naalehu HI	15590na 9930as			
1700	1800	mtwhf	USA, Voice of America 9795as	5990as 11955as	6045as 12005as	9525as 15255as	9670as	1800	1900		USA, Voice of America	6035af	6040af	9565as	9760as
1700	1800	а	USA, WBCQ Monticello ME	17495na 11875na			15745	1800	1900	а	11920af USA, WBCQ Monticello ME	11975af 17495na	13710af	15240af	15580af
1700	1800 1800		USA, WEWN Birmingham AL USA, WHRA Greenbush ME	17650af	13615na	15375na	15745na	1800 1800	1900 1900		USA, WEWN Birmingham AL USA, WHRA Greenbush ME	11875na 17650af	13615na	15375na	15745na
1700 1700	1800 1800		USA, WHRI Noblesville IN USA, WINB Red Lion PA	13760sa 13570eu	15105na			1800	1900		USA, WHRI Noblesville IN	9495sa	13760na		
1700 1700	1800 1800		USA, WINB Red Lion PA USA, WJCR Upton KY USA, WMLK Bethel PA	7490va 15265eu	13595as			1800 1800	1900 1900		USA, WINB Red Lion PA USA, WJCR Upton KY	13570eu 7490va	13595as		
1700 1700	1800 1800		USA, WRMI Miami FL USA, WSHB Cypress Crk SC	15725am 18910af				1800 1800	1900 1900		USA, WMLK Bethel PA USA, WRMI Miami FL	15265eu 15725am			
1700	1800		LISA WTIC Newport NC	9370na				1800	1900		USA, WSHB Cypress Crk SC USA, WTJC Newport NC	15665eu	18910af		
1700 1700	1800 1800		USA, WWCR Nashville TN USA, WWFV McCaysville GA USA, WWFV McCaysville GA	9475am 12172am	12160am	13845am	15685am	1800 1800	1900 1900		USA, WWCR Nashville TN	9370na 9475am	12160am	13845am	15685am
1700	1800	mtwhf	USA, WWFV McCaysville GA USA, WYFR Okeechobee FL	9400va 18980eu	21455eu			1800 1800	1900 1900	mtwhf	USA, WWFV McCaysville GA USA, WWFV McCaysville GA	12172am 9400va			
	1800		T 1	40/51				1800	1900		USA, WYFR Okeechobee FL	18980eu			
1700 1700	1800 1800	l	Zambia, Christian Voice	4965do				1800 1800	1900 1900		Yemen, Rep of Yemen Radio	9780do			
1700 1700 1700 1700	1800 1800 1800	vl vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp	6165do 4828do	6265do 6045do						Zambia, Christian Voice	4965do			
1700 1700 1700 1700 1715	1800 1800		Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio	6165do 4828do 7155af	6265do 6045do			1800	1900	vl vl	Zambia, Christian Voice Zambia, National BC Corp	4965do 6165do	6265do		
1700 1700 1700 1700 1715 1725 1725	1800 1800 1800 1730 1740 1740	vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio	6165do 4828do 7155af 5855me 5855eu	6265do 6045do			1800 1800 1815	1900 1900 1845	vl vl s	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia	4965do 6165do 4828do 7155af	6265do 6045do		
1700 1700 1700 1700 1715 1725 1725 1730 1730	1800 1800 1800 1730 1740 1740 1745 1745	vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Ascension Is, Unt Nations Radio Libya, Voice of Africa	6165do 4828do 7155af 5855me 5855eu 17735va 11815af	6265do 6045do 17725af			1800 1800	1900 1900	vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio	4965do 6165do 4828do 7155af 21630af	6045do		
1700 1700 1700 1700 1715 1725 1725 1730 1730 1730	1800 1800 1800 1730 1740 1745 1745 1745 1745	vl a	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radia Lufania Armenia, Trans World Radia Germany, Trans World Radia Ascension Is, Unt Nations Radia Libya, Voice of Africa S Africa, United Nations Radia UK, United Nations Radia	6165do 4828do 7155af 5855me 5855eu 17735va 11815af 6125af 15495va	6045do 17725af			1800 1800 1815 1830 1830 1830	1900 1900 1845 1900 1900 1900	vl s	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio	4965do 6165do 4828do 7155af 21630af 7105eu 13725na			
1700 1700 1700 1700 1715 1725 1725 1730 1730 1730 1730 1730	1800 1800 1800 1730 1740 1745 1745 1745 1745 1745 1800	vl a	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Ascension Is, Unt Nations Radio Libya, Voice of Africa S Africa, United Nations Radio UK, United Nations Radio Belaium. Radio Vlandeeren Intl	6165do 4828do 7155af 5855me 5855eu 17735va 11815af 6125af 15495va 5910eu	6045do 17725af 9925eu	13770me		1800 1800 1815 1830 1830 1830 1830 1830	1900 1900 1845 1900 1900 1900 1900 1900	vl s	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio Mongolia, Voice of Netherlands, Radio	4965do 6165do 4828do 7155af 21630af 7105eu 13725na 12085as 9895af	6045do 7210as 13700af	17605af	
1700 1700 1700 1700 1715 1725 1725 1730 1730 1730 1730 1730 1730	1800 1800 1800 1730 1740 1745 1745 1745 1745 1800 1800	vl a	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Ascension Is, Unt Nations Radio Libya, Voice of Africa S Africa, United Nations Radio UK, United Nations Radio Belgium, Radio Vlaanderen Intl Guam, Adventist World Radio Vetherlands, Radio	6165do 4828do 7155af 5855me 5855eu 17735va 11815af 6125af 15495va 5910eu 7455as 6020af	6045do 17725af 9925eu 11560me 11655af			1800 1800 1815 1830 1830 1830 1830 1830 1830	1900 1900 1845 1900 1900 1900 1900 1900 1900	vl s t h	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio Mongolia, Voice of Netherlands, Radio Slovakia, R Slovakia International	4965do 6165do 4828do 7155af 21630af 7105eu 13725na 12085as 9895af 5915eu	6045do 7210as	17605af 7345eu	
1700 1700 1700 1700 1700 1715 1725 1730 1730 1730 1730 1730 1730 1730	1800 1800 1800 1730 1740 1745 1745 1745 1745 1800 1800 1800 1800	vl a vl	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Ascension Is, Unt Nations Radio Libya, Voice of Africa S Africa, United Nations Radio Belgium, Radio Vlaanderen Intl Guam, Adventist World Radio Netherlands, Radio Philippines, Radyo Pilipinas S Africa, Adventist World Radio	6165do 4828do 7155af 5855me 5855eu 17735va 11815af 6125af 15495va 5910eu 7455as 6020af 11720me 12130af	6045do 17725af 9925eu 11560me	13770me 17720me		1800 1800 1815 1830 1830 1830 1830 1830 1830 1830	1900 1900 1845 1900 1900 1900 1900 1900 1900 1900	vl s	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio Mongolia, Voice of Netherlands, Radio Slovakia, R Slovakia International Sweden, Radio	4965do 6165do 4828do 7155af 21630af 7105eu 13725na 12085as 9895af 5915eu 6065va 9765va	6045do 7210as 13700af 6055eu		
1700 1700 1700 1700 1715 1725 1730 1730 1730 1730 1730 1730 1730 1730	1800 1800 1800 1730 1740 1745 1745 1745 1800 1800 1800 1800 1800	vl a	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Ascension Is, Unt Nations Radio Libya, Voice of Africa S Africa, United Nations Radio UK, United Nations Radio Belgium, Radio Vlaanderen Intl Guam, Adventist World Radio Netherlands, Radio Netherlands, Radio S Africa, Adventist World Radio S Africa, Gwentist World Radio S Africa, Radio Litonia Swaziland, Trans World Radio	6165do 4828do 7155af 5855me 5855eu 17735va 11815af 6125af 15495va 5910eu 7455as 6020af 11720me 12130af 7155af 9500af	17725af 9925eu 11560me 11655af 15190me	17720me		1800 1800 1815 1830 1830 1830 1830 1830 1830	1900 1900 1845 1900 1900 1900 1900 1900 1900	vl s t h mtwhhfa	Zambio, National BC Corp Simbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio Mongolia, Voice of Netherlands, Radio Slovakia, R Slovakia International Sweden, Radio Sweden, Radio Turkey, Voice of UK, BBC World Service	4965do 6165do 4828do 7155af 21630af 7105eu 13725na 12085as 9895af 5915eu 6065va 9765va 6140as 3255af	7210as 13700af 6055eu 7125as 6005af	7345eu 6190af	6195eu
1700 1700 1700 1700 1700 1715 1725 1730 1730 1730 1730 1730 1730 1730 1730	1800 1800 1730 1740 1745 1745 1745 1745 1800 1800 1800 1800 1800	vl a vl	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Azcension Is, Unt Nations Radio Libya, Voice of Africa S Africa, United Nations Radio UK, United Nations Radio UK, United Nations Radio Belgium, Radio Viaonderen Intl Guam, Adventist World Radio Netherlands, Radio Netherlands, Radio S Africa, Adventist World Radio S Africa, Adventist World Radio Swaziland, Trans World Radio Swaziland, Trans World Radio	6165do 4828do 7155af 5855me 5855eu 17735va 11815af 6125af 15495va 5910eu 7455as 6020af 11720me 12130af 7155af 9500af 9605af	17725af 9925eu 11560me 11655af 15190me	17720me 15555af		1800 1800 1815 1830 1830 1830 1830 1830 1830 1830	1900 1900 1845 1900 1900 1900 1900 1900 1900 1900 190	vl s t h mtwhhfa	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio Mongolia, Voice of Netherlands, Radio Slovakia, R Slovakia International Sweden, Radio Sweden, Radio Turkey, Voice of UK, BBC World Service 9410eu	4965do 6165do 4828do 7155af 21630af 7105eu 13725na 12085as 9895af 5915eu 6065va 9765va 6140as 3255af 9630af	7210as 13700af 6055eu 7125as 6005af 9740pa	7345eu 6190af 15400af	6195eu 15420af
1700 1700 1700 1700 1715 1725 1730 1730 1730 1730 1730 1730 1730 1730	1800 1800 1730 1740 1745 1745 1745 1745 1800 1800 1800 1800 1800 1800 1800 180	vl a vl	Zambio, National BC Corp Zimbabwe, Zimbabwe BC corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Ascension Is, Unt Nations Radio Libya, Voice of Africa S Liftica, United Nations Radio UK, United Nations Radio Belgium, Radio Viaonderen Intl Guam, Adventist World Radio Netherlands, Radio Netherlands, Radio Netherlands, Radio Netherlands, Radio S Africa, Adventist World Radio S Africa, Adventist World Radio Swaziland, Trans World Radio Switzeland, Swiss R International UK, BBC World Service UK, Melin Network One	6165do 4828do 7155af 5855me 5855me 17735va 11815af 6125af 15495va 5910eu 7455as 6020af 11720me 12130af 7155af 9500af 9605af 7385as 12065as	17725af 9925eu 11560me 11655af 15190me	17720me 15555af 11660as		1800 1800 1815 1830 1830 1830 1830 1830 1830 1830 1830	1900 1900 1845 1900 1900 1900 1900 1900 1900 1900 190	vl s t h mtwhhfa	Zambio, National BC Corp Zimbabwe Zimbabwe Zimbabwe Zimbabwe SC Corp S Africe, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio Mongolia, Voice of Netherlands, Radio Slovakia, R Slovakia International Sweden, Radio Turkey, Voice of UK, BBC World Service 9410eu 15575me USA, Voice of America	4965do 6165do 4828do 7155af 21630af 7105eu 13725na 12085as 9895af 5915eu 6065va 9765va 6140as 3255af 9630af 17830af 13675af	7210as 13700af 6055eu 7125as 6005af 9740pa 17840na 15455af	7345eu 6190af	6195eu 15420af
1700 1700 1700 1710 1715 1725 1730 1730 1730 1730 1730 1730 1730 1730	1800 1800 1730 1740 1745 1745 1745 1800 1800 1800 1800 1800 1800 1800 180	vl a vl	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Ascension Is, Unt Nations Radio Libya, Voice of Africa S Africa, United Nations Radio UK, United Nations Radio Belgium, Radio Vlaanderen Intl Guam, Adventist World Radio Netherlands, Radio Philippines, Radyo Pilipinas S Africa, Adventist World Radio S Africa, Radio Lufonia Swaziland, Trans World Radio Swaziend, Trans World Radio Swaziend, Trans World Radio Swizerland, Swiss R International UK, BBC World Service UK, Merlin Network One Vatican City, Vatican Radio Paraguay, Radio Nacional	6165do 4828do 7155do 5855me 11815do 6125di 15495va 5910eu 7455as 6020di 11720me 12130di 7155di 9500di 9605di 7385as 12065as 13765di 9739sa	17725af 9925eu 11560me 11655af 15190me 13790af 9780as 15560as 15570af	17720me 15555af 11660as 17515af	11005	1800 1800 1815 1830 1830 1830 1830 1830 1830 1830 1830	1900 1900 1845 1900 1900 1900 1900 1900 1900 1900 190	vl s t h mtwhhfa s	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio Mangolia, Voice of Netherlands, Radio Slovakia, R Slovakia International Sweden, Radio Sweden, Radio Turkey, Voice of UK, BBC World Service 9410eu 15575me	4965do 6165do 4828do 7155af 21630af 7105eu 13725na 12085as 9895af 5915eu 6065va 9765va 6140as 3255af 9630af 17830af	7210as 13700af 6055eu 7125as 6005af 9740pa 17840na	7345eu 6190af 15400af 21470af	6195eu 15420af
1700 1700 1700 1700 1715 1725 1730 1730 1730 1730 1730 1730 1730 1730	1800 1800 1730 1740 1745 1745 1745 1745 1800 1800 1800 1800 1800 1800 1800 180	vl a vl as s mtwhf	Zambio, National BC Corp Zimbabwe, Zimbabwe BC Corp S Africa, Radio Lufonia Armenia, Trans World Radio Germany, Trans World Radio Ascension Is, Unt Nations Radio Libya, Voice of Africa S Africa, United Nations Radio UK, United Nations Radio Belgium, Radio Vlaonderen Intl Guum, Adventist World Radio Netherlands, Radio Philippines, Radyo Pilipinas S Africa, Radio Lufonio Swazilend, Trans World Radio Swazilend, Trans World Radio Swazilend, Trans World Radio Swizerland, Swiss R International UK, BBC World Service UK, Merlin Network One	6165do 4828do 7155af 5855me 5855eu 17735va 11815af 6125af 15495va 5910eu 7455as 6020af 11720me 12130af 7155af 9500af 9605af 7385as 12065as	17725af 9925eu 11560me 11655af 15190me	17720me 15555af 11660as	11935as	1800 1800 1815 1830 1830 1830 1830 1830 1830 1830 1830	1900 1900 1845 1900 1900 1900 1900 1900 1900 1900 190	vl s t h mtwhhfa s	Zambio, National BC Corp Zimbobwe, Zimbobwe BC Corp S Africa, Radio Lufonia Ascension Is, RTE Radio Belarus, R Belarus International Canada, RTE Radio Mongolia, Voice of Netherlands, Radio Slovakia, R Slovakia International Sweden, Radio Sweden, Radio Turkey, Voice of UK, BBC World Service 9410eu 15575me USA, Voice of America Albanio, R Tirona International	4965da 6165da 6165da 7155af 21630af 7105eu 13725na 12085as 5915eu 6065va 9765va 6140as 3255af 17830af 13675af 7210eu	7210as 13700af 6055eu 7125as 6005af 9740pa 17840na 15455af	7345eu 6190af 15400af 21470af	6195eu 15420af

1900 UTC

3:00 PM EDT 2:00 PM CDT 12:00 PM PDT

Shortwave Guide

4:00 PM EDT 3:00 PM CDT 1:00 PM PDT 2000 UTC

	LGOLINCILS	• • • • • • • • •	• • •		• • •	• • • • •	• • •	• •	• • • •	• • • • • • • • • •	• • •		• • •	
1900 1900	1915 1927	Congo, RTV Congolaise Vietnam, Voice of	5985do 7145eu	9730eu			2000	2010 2015		Vatican City, Vatican Radio Swaziland, Trans World Radio	4005eu 3200af	5883eu	7250eu	
1900	1930	Hungary, Radio Budapest	6025eu	7135eu			2000 2000	2025 2027		Netherlands, Radio Iran, VOIRI	6020af 6110eu	11655af 7215eu	13700af 7255eu	17605af 9022eu
1900 1900		Iran, VÖIRI Israel, Kol Israel	7255me 6280va	7750me 9435va	15640va	15650va	2000 2000 2000	2030 2030		Mongolia, Voice of	12015eu	12085eu		
1900 1900		Philippines, Radyo Pilipinas Turkey, Voice of	11720me 6140as	15190me 7125as	17720pa					Switzerland, Swiss R International 13790af	6165af	9605af	11910af	13660af
1900		Germany, Deutsche Welle 15390af	11765af 17810af	11810af	13610af	15135af	2000	2030		USA, Voice of America 9690as	4950af 9760as	6035af 11855af	6095as 11975af	7415af 13710af
1900	1945	India, All India Radio	7410as	9950as	11620as	11935as	2000	2030		15240af Vatican City, Vatican Radio	15580af 9660af	17725af 11625af	17885af 13765af	
1900	1945	13790af Iraq, Radio Iraq International	15200af 9684va	17670af 11785va			2000 2000	2045 2056		Germany, Deutsche Welle China China Radio International	9725eu 5965eu	9440af	9840eu	11735af
1900 1900	1950 1956	New Zealand, R New Zealand Int China China Radio International	15120pa 6165af	9440af	9585af					13640af Poland, Radio Polonia				
1900	2000	Anguilla, Caribbean Beacon	11775am	/440ui	750541		2000 2000	2059 2100		Algeria, R Algiers International	6030eu 11715eu	7185eu 15160eu	7265eu	9540eu
1900 1900	2000 vl 2000 vl	Australia, ABC/Katherine Australia, ABC/Tennant Creek	2485do 2325do				2000 2000	2100 2100 2100	vl	Anguilla, Caribbean Beacon Australia, ABC/Alice Springs	11775am 2310do			
1900	2000	Australia, Radio 9815as	6080as 11880va	7240pa	9500as	9580va	2000 2000	2100 2100	vl vl	Australia, ABC/Katherine Australia, ABC/Tennant Creek	2485do 2325do			
1900 1900	2000 vl 2000	Botswana, Radio	3356do	4820do 7500eu			2000	2100		Australia, Radio	9500as	9580va	9815as	11880va
1900	2000 vl	Bulgaria, Radio Cameroon, RTV/Yaounde	7200eu 4850do	/300eu			2000 2000	2100 2100	as	Australia, Radio	6080as	7240pa		
1900 1900	2000 2000	Canada, CFRX Toronto ON Canada, CFVP Calgary AB	6070do 6030do				2000	2100	vl vl	Botswana, Radio Cameroon, RTV/Yaounde	3356do 4850do	4820do		
1900 1900	2000 2000	Canada, CHNX Halifax, NS Canada, CKZN St John's NF	6130do 6160do				2000 2000	2100 2100		Canada, CBC Northern Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB	9625do 6070do			
1900 1900	2000 2000	Canada, CKZU Vancouver BC	6160do				2000 2000	2100 2100		Canada, CHNX Halifax, NS	6030do 6130do			
1900	2000	Canada. CBC Northern Service Costa Rica, R for Peace Intl	9625do 15048va	21815usb			2000 2000	2100 2100		Canada, CKZN St John's NF Canada, CKZU Vancouver BC	6160do 6160do			
1900 1900	2000 2000	Costa Rica, University Network Ecuador, HCJB	15048va 17660eu	21815usb			2000	2100 2100		Costa Rica, R for Peace Intl Costa Rica, University Network	15048va 15048va	21815va 15065va	21815usb	
1900 1900	2000 mtwhf 2000 a/monthly	Eqt Guinea, Radio Africa Finland, Scandv Weekend Radio	15185af 11690va	11720va			2000 2000	2100		Ecuador, HCJB	17660eu	1300340	21013030	
1900	2000	Germany, Overcomer Ministries	17870na				2000	2100 2100	mtwhf a/monthly	Eqt Guinea, Radio Africa Finland, Scandv Weekend Radio	15185af 11690va	11720va 11735af		
1900 1900	2000 vl	Germany, Voice of Hope Ghana, Ghana BC Corp	7290eu 3366do	11735af 4915do			2000 2000	2100 2100	vl	Germany, Voice of Hope Ghana, Ghana BC Corp	7290me 3366do	4915do		
1900 1900	2000 s 2000 vl	Greece, Voice of Italy, IRRS	7455eu 3985va	17565sa	17705na		2000 2000	2100 2100	vl	Indonesia, Voice of Italy, IRRS	9525va 3985va	11785va	15149va	
1900 1900	2000	Kenya, Kenya BC Corp Kuwait, Radio	4935do 11990va				2000 2000	2100		Kenya, Kenya BC Corp Kuwait, Radio	4935do 11990va			
1900	2000 vl	Lesotho, Radio	4800do				2000 2000	2100 2100 2100	vl vl	Lesotho, Radio Liberia, ELWA	4800do			
1900 1900	2000 vl 2000 vl	Liberia, ELWA Liberia, R Liberia International	4760do 5100do				2000	2100	vl	Liberia, R Liberia International	4760do 5100do			
1900 1900	2000 2000 vl	Liberia, Voice of Hope Malawi, Malawi BC Corp	11530af 3380do				2000 2000	2100 2100	vl	Malawi, Malawi BC Corp Malaysia, Radio	3380do 7295do			
1900	2000	Malaysia, Radio	7295do				2000 2000	2100 2100		Namibia, Namibian BC Corp New Zealand, R New Zealand Int	3270af 17675pa	3289af		
1900 1900	2000 mtwhfa 2000	Malta, Voice of Mediterranean Namibia, Namibian BC Corp	7440eu 3270af	3289af			2000 2000	2100 2100	vl	New Zealand, ZLXA Nigeria, Radio/Enugu	3935do 6025do	7290do		
1900 1900	2000 2000	Netherlands, Radio New Zealand, ZLXA	6020af 3935do	11655af	13700af	17605af	2000 2000	2100 2100	vi vl	Nigeria, Radio/Ibadan	6050do 4770do	6090do	7275do	9570do
1900 1900	2000 vl	Nigeria, Radio/Enugu	6025do				2000	2100	vl	Nigeria, Radio/Kaduna Nigeria, Radio/Lagos	3326do 7255af	4990do	/2/300	93/000
1900	2000 vl	Nigeria, Radio/Ibadan Nigeria, Radio/Kaduna	6050do 4770do	6090do	7275do	9570do	2000 2000	2100 2100	vl vl	Nigeria, Voice of Papua New Guinea, NBC	4890do	15120af		
1900 1900	2000 vl 2000 vl	Nigeria, Radio/Lagos Nigeria, Voice of	3326do 7255af	4990do 15120af			2000	2100		Russia, Voice of Russia WS 7340eu	5940eu 9890eu	5950eu	6045eu	7300eu
1900	2000	North Korea, Voice of Korea 13760na	4405va	6574na	9335na	11710na	2000 2000	2100 2100		Russia, World Beacon S Africa, World Beacon	7360eu 3230af	11640af		
1900	2000	Russia, Voice of Russia WS	5940eu	5950eu	6045eu	7340eu	2000 2000	2100 2100	vl	Sierra Leone, Sierra Leone BS Solomon Islands, SIBC	3230af 3316do 5020do	1101001		
1900		9775eu Russia, World Beacon	9890eu 7360eu				2000	2100	mtwhf	Spain, R Exterior Espana	9595af	9680eu		
1900 1900	2000 2000	S Africa, World Beacon Sierra Leone, Sierra Leone BS	3230af 3316do	11640af			2000 2000	2100 2100	irreg vl	Sri Lanka, Sri Lanka BC Corp Syria, Radio Damascus	4940do 12085eu	13610eu		
1900 1900	2000 vl	Solomon Islands, SIBC	5020do 5975om	7275eu			2000 2000	2100 2100		Uganda, Radio UK, BBC World Service	4976do 3255af	5026do 5975pa	6005af	6190af
1900	2000 irreg	South Korea, R Korea Intl Sri Lanka, Sri Lanka BC Corp	4940do	727360						6195eu 15400af	9410eu 17830af	9630af	9740pa	11835af
1900 1900		Sri Lanka, Sri Lanka BC Corp Swaziland, Trans World Radio	6010eu 3200af				2000 2000	2100 2100		UK, World Beacon USA, Armed Forces Radio	7420af 4278va	9675af 4319va	4993va	5765va
1900 1900	2000 2000	Thailand, Radio Uganda, Radio	9535eu 4976do	5026do			2000	2100		6350va 12579va	6458va	6847va	10320va	10940va
1900		UK, BBC World Service	3255af	6005af	6190af	6195af	2000	2100		USA, KAIJ Dallas TX	12689va 13815va	13362va	16847va	
		9410eu 17830af	9630af	9740pa	15400af	15575as	2000 2000	2100 2100		USA, KJES Vado NM USA, KTBN Salt Lake City UT	15385au 15590na			
1900 1900	2000 a 2000 hf	UK, BBC World Service UK, Merlin Network One	17840na 6130af				2000 2000	2100 2100	a	USA, KWHR Naalehu HI USA, WBCQ Monticello ME	17510as 17495na			
1900	2000	UK, World Beacon	9675eu 4278va	15585eu	4993va	5765va	2000	2100 2100	-	USA, WEWN Birmingham AL USA, WHRA Greenbush ME	11875na 17650af	13615na	15375na	15745na
1900	2000	USA, Armed Forces Radio 6350va	6458va	4319va 6847va	10320va	10940va	2000	2100		USA, WHRI Noblesville IN USA, WINB Red Lion PA	5745sa	9495sa	13760na	
1900	2000	USA, KAIJ Dallas TX	12689va 13815va	13362va	16847va		2000 2000	2100 2100		USA, WJCR Upton KY	13570eu 7490va	13595as		
1900 1900		USA, KJES Vado NM USA, KTBN Salt Lake City UT	15385na 15590na				2000 2000	2100 2100		USA, WMLK Bethel PA USA, WRMI Miami FL	15265eu 15725am			
1900	2000	USA, KWHR Naalehu HI USA, VOA Special Enalish	9930as	10015	12/40		2000 2000	2100 2100		USA, WTJC Newport NC USA, WWCR Nashville TN	9370na 9475am	12160am	13845am	15685am
1900 1900		USA, Voice of America	9785me 4950af	12015me 6035af	13640me 7415af	9525pa	2000 2000	2100 2100	mtwhf	USA, WWFV McCaysville GA USA, WWFV McCaysville GA	12172am 9400va			
		9690as 13710af	9760as	11870pa	11920af	11975af	2000 2000	2100 2100	vl	USA, WYFR Okeechobee FL Vanuatu, Radio	7355eu 3945do	15565eu 4960do	7260do	
1900 1900		USA, WBCQ Monticello ME USA, WEWN Birmingham AL	17495na 11875na	13615na	15375na	15745	2000	2100		Zambia, Christian Voice	4965do		720000	
1900	2000	USA, WHRA Greenbush ME	17650af		133/300	15745na	2000 2000	2100 2100	vl vl	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp	6165do 4828do	6265do 6045do		
1900 1900	2000	USA, WHRI Noblesville IN USA, WINB Red Lion PA	9495sa 13570eu	13760na			2000 2025	2100 2045		USA, WSHB Cypress Crk SC	11550eu 7220af	15665af 9710af	11880af	
1900 1900		USA, WJCR Upton KY USA, WMLK Bethel PA	7490va 15265eu	13595as			2025 2030 2030	2045 2045	vl	Italy, RAI International Libya, Voice of Africa Thailand, Radio	7220af 11815af 9535eu	17725af		
1900	2000	USA, WRMI Miami FL	15725am				2030 2030	2057 2100	th	Vietnam, Voice of Belarus, R Belarus International	7145eu	9730eu 7210as		
1900 1900	2000	USA, WSHB Cypress Crk SC USA, WTJC Newport NC	15665eu 9370na	18910af			2030	2100	īn	Cuha Radio Havana	7105eu 13660eu	13750eu		
1900 1900	2000	USA, WWCR Nashville TN USA, WWFV McCaysville GA	9475am 12172am	12160am	13845am	15685am	2030 2030	2100 2100		Egypt, Radio Cairo Germany, Adventist World Radio S Africa, Adventist World Radio	15375af 9615af			
1900	2000 mtwhf	USA, WWFV McCaysville GA	9400va				2030 2030	2100 2100		S Africa, Adventist World Radio Sweden, Radio	9745af 6065va	9445va		
1900 1900	2000	USA, WYFR Okeechobee FL Zambia, Christian Voice	18980eu 4965do				2030 2030	2100 2100		Sweden, Radio Turkey, Voice of USA, Voice of America	9525as 6035af	6095as	7415af	9690as
1900 1900		Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp	6165do 4828do	6265do 6045do			2030	2100		9760as 17725af	11975af	13710af	15240af	15580af
1915 1930	1925	Rwanda, Radio Greece, Voice of	6055do 7475eu	9375eu			2030	2100	as	USA, Voice of America	17885af 4950af	05:0		
1930	2000	Austria, R Austria International	5945eu	6155eu	70.55	2000	2030 2040	2100 2100	mtwhfa	Uzbekistan, Radio Tashkent Armenia, Voice of	7105eu 4810eu	9540eu 9965eu		
1930 1930	2000 vl	Iran, VOIRI Papua New Guinea, NBC	6110eu 4890do	7215eu	7255eu	9022eu	2045	2100		India, All India Radio 9950eu	7150au 11620au	7410eu 11715au	9650eu	9910au
1930 1930	2000	Poland, Radio Polonia Switzerland, Swiss R International	6030eu 9605af	7185eu 11910af	7265eu 13660af	9540eu	2050 2050	2100 2100	m	Vatican City, Vatican Radio Vatican City, Vatican Radio	4005eu 9645eu	5883eu	7250eu	
1935	1955	Italy, RAI International	5975eu	7285eu	9760eu		2000	2.00		. S. con Sing Foncul Radio	, 0.000			
1940 1950		Vatican City, Vatican Radio New Zealand, R New Zealand Int	9645eu 17675pa											

5:00 PM EDT 4:00 PM CDT 2:00 PM PDT

Shortwave Guide

6:00 PM EDT 5:00 PM CDT 3:00 PM PDT 2200 UTC

2100 2100 2100 2100 2100 2100 2100	2110 2127 2130 2130 2130 2130	vl vl vl	Kenya, Kenya BC Corp Czech Rep., Radio Prague Intl Australia, ABC/Alice Springs Australia, ABC/Katherine Australia, ABC/Tennant Creek Australia, Radio	4935do 5930va 2310do 2485do 2325do 7240pa	9430va 9500as	9580va	9660pa	2130 2130 2130 2130 2130 2130	2156 2200 2200 2200 2200 2200	vl vl vl	China, China Radio International Australia, ABC/Alice Springs Australia, ABC/Katherine Australia, ABC/Tennant Creek Australia, Radio	5965eu 4835do 5025do 4910do 7240pa 21740va	9840eu 9660pa	11880va	12080ра
2100 2100 2100 2100 2100	2130 2130 2130 2130 2130 2130		11880va China China Radio International Cuba, Radio Havana Hungany, Radio Budapest Mexico, R. Mexico International Turkey, Voice of	12080pa 5965eu 13660eu 6025eu 9705am 9525as	17715va 9840eu 13750eu 11770am	21740va 11735af	13640af	2130 2130 2130 2130	2200 2200 2200 2200 2200		Belgium, Radio Vlaanderen Intl Guam, Adventist World Radio Iran, VOIRI Uzbekistan, Radio Tashkent	13660am 11960as 9780va 9540eu	11980as 11740va		
2100 2100	2130 2145	sa	UK, BBC World Service Germany, Deutsche Welle	5975ca 9615af	9690af	9765va	15135va				2200				
2100 2100 2100	2156 2156 2159		North Korea, Voice of Korea Romania, R Romania International Canada, R Canada International 13650eu	17560va 6574va 5955eu 5995eu	17835af 9335va 7195eu 7235eu	7215eu 9770eu	9690eu 9805eu	2200 2200 2200 2200 2200	2210 2210 2220 2225	vl vl s	Malawi, Malawi BC Corp Zambia, National BC Corp Greece, Voice of Italy, RAI International	3380do 6165do 9420au 9675as	6265do 15650au 11900as	15240as	
2100 2100 2100 2100 2100	2200 2200 2200 2200 2200	vl vl	Angola, R. Nacional de Angola Anguilla, Caribbean Beacon Botswana, Radio Bulgaria, Radio Cameroon, RTV/Yaounde	3374va 11775am 3356do 7200eu 4850do	4950va 4820do 7500eu	7245va		2200 2200 2200 2200 2200	2227 2230 2230 2230	mtwhf vl	Iran, VOIRI India, All India Radio 9950eu Mexico, R Mexico International Papua New Guinea, NBC	9780va 7150au 11620au 9705am 4890do	11740va 7410eu 11715au 11770am	9650eu	9910au
2100 2100 2100	2200 2200 2200		Canada, CBC Northern Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB	9625do 6070do 6030do				2200 2200	2230 2230	mtwhf	South Korea, R Korea Intl USA, Voice of America 13710af	3975eu 6035af	7415af	11655af	11975af
2100 2100 2100 2100 2100	2200 2200 2200 2200 2200 2200		Canada, CHNX Halifax, NS Canada, CKZN St John's NF Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl Costa Rica, University Network	6130do 6160do 6160do 15048va 15048va	21815va 15065va	21815usb		2200 2200 2200 2200 2200 2200	2245 2245 2256 2259 2300		Egypt, Radio Cairo USA, WYFR Okeechobee FL China China Radio International Canada, R Canada International Anguilla, Caribbean Beacon	9990eu 7580eu 7170eu 11705as 6090am	11740na	15565af	21525af
2100 2100 2100 2100 2100	2200 2200 2200 2200 2200	mtwhf f/monthly vl	Ecuador, HCJB Egypt, Radio Cairo Eqt Guinea, Radio Africa Finland, Scandv Weekend Radio Ghana, Ghana BC Corp	17660eu 15375af 15185af 11690va 3366do	11720va 4915do			2200 2200 2200 2200 2200 2200	2300 2300 2300 2300 2300	ν ν	Australia, ABC/Alice Springs Australia, ABC/Katherine Australia, ABC/Tennant Creek Australia, Radio Cameroon, RTV/Yaounde	4835do 5025do 4910do 11715va 4850do	17795va	21740va	
2100 2100	2200 2200		Hungary, Radio Budapest India, All India Radio 9950eu	3975eu 7150au 11620au	7410eu 11715au	9650eu	9910au	2200 2200 2200	2300 2300 2300		Canada, CBC Northern Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB	9625do 6070do 6030do			
2100 2100	2200 2200	vl	Italy, IRRS Japan, Radio 17825na	3985va 6115eu 21670pa	6180eu	11830eu	11855af	2200 2200 2200	2300 2300 2300		Canada, CHNX Halifax, NS Canada, CKZN St John's NF Canada, CKZU Vancouver BC	6130do 6160do 6160do			
2100 2100 2100 2100	2200 2200 2200 2200 2200	vl vl vl vl	Lesotho, Radio Liberia, ELWA Liberia, R Liberia International Malawi, Malawi BC Corp	4800do 4760do 5100do 3380do				2200 2200 2200 2200	2300 2300 2300 2300 2300	mtwhf f/monthly	Costa Rica, R for Peace Intl Costa Rica, University Network Eqt Guinea, Radio Africa Finland, Scandy Weekend Radio	15048va 15048va 15185af 11690va	15065va 15065va 11720va	21815usb 21815usb	
2100 2100 2100 2100 2100	2200 2200 2200 2200 2200 2200	νl	Malaysia, Radio Namibia, Namibian BC Corp New Zealand, R New Zealand Int New Zealand, ZLXA	7295do 3270af 17675pa 3935do	3289af			2200 2200 2200 2200	2300 2300 2300 2300	Al Al	Ghana, Ghana BC Corp Italy, IRRS Liberia, R Liberia International Malaysia, Radio	3366do 3985va 5100do 7295do	4915do		
2100 2100 2100 2100 2100	2200 2200 2200 2200 2200	vl vl	Nigeria, Radio/Enugu Nigeria, Radio/Ibadan Nigeria, Radio/Kaduna Nigeria, Radio/Lagos Palau, KHBN/Voice of Hope	6025do 6050do 4770do 3326do 9985as	6090do 4990do	7275do	9570do	2200 2200 2200 2200 2200 2200	2300 2300 2300 2300 2300	vl vl	Namibia, Namibian BC Corp New Zealand, R New Zealand Int New Zealand, ZLXA Nigeria, Radio/Ibadan Nigeria, Radio/Ibadan	3270af 17675pa 3935do 6025do 6050do	3289af		
2100 2100 2100	2200 2200 2200	vl	Papua New Guinea, NBC Russia, World Beacon S Africa, World Beacon	4890do 7360eu 3230af	11640af			2200 2200 2200	2300 2300 2300	vl vl	Nigeria, Radio/Kaduna Nigeria, Radio/Lagos Palau, KHBN/Voice of Hope	4770do 3326do 9955as	6090do 4990do 9965as	7275do 9985as	9570do
2100 2100 2100	2200 2200 2200	vl	Sierra Leone, Sierra Leone BS Solomon Islands, SIBC South Korea, R Korea Intl	3316do 5020do 15575eu	9545do			2200 2200 2200	2300 2300 2300	vl as	Sierra Leone, Sierra Leone BS Solomon Islands, SIBC Spain, R Exterior Espana	3316do 5020do 9595af	9545do 9680eu		
2100 2100 2100	2200 2200 2200	irreg vl	Sri Lanka, Sri Lanka BC Corp Syria, Radio Damascus UK, BBC World Service 6005af	4940do 12085eu 3255af 6110as	13610eu 3915as 6190af	5965as 6195va	5975pa 9410eu	2200 2200 2200 2200	2300 2300 2300 2300	irreg	Sri Lanka, Sri Lanka BC Corp Taiwan, R Taiwan International Turkey, Voice of UK, BBC World Service	4940do 5810eu 6020eu 5965as	9355eu 9655na 5975na	6175na	6195va
2100 2100	2200 2200		9740pa UK, World Beacon Ukraine, R Ukraine International	11835af 9675af 5905va	12095sa 9560va	15400af 11770va	57/5	2200	2300	fa	7105as 12080pa UK, Global Kitchen/Merlin	9590na 12095sa 3955eu	9660as 15400af 6170eu	11835af 7165eu	11955as
2100	2200		USA, Armed Forces Radio 6350va 12579va USA, KAIJ Dallas TX	4278va 6458va 12689va 13815va	4319va 6847va 13362va	4993va 10320va 16847va	5765va 10940va	2200	2300		USA, Armed Forces Radio 6350va 12579va USA, KAIJ Dallas TX	4278va 6458va 12689va 13815va	4319va 6847va 13362va	4993va 10320va 16847va	5765va 10940va
2100 2100 2100 2100	2200 2200 2200 2200		USA, KTBN Salt Lake City UT USA, KWHR Naalehu HI USA, Voice of America 9595as	15590na 17510as 6035af 9670as	6040me 9760me	6095as 11775pa	7415af 11870pa	2200 2200 2200 2200	2300 2300 2300 2300		USA, KYBN Salt Lake City UT USA, KWHR Naalehu HI USA, Voice of America	15590na 17510as 7215as 15290as	9770as 15305pa	9890as 17735pa	11760as 17820as
2100 2100	2200 2200	а	11975of 17725of USA, WBCQ Monticello ME USA, WBCQ Monticello ME	13710af 17735as 7415na 17495na	15185pa 17820as	15240af	15580af	2200 2200 2200 2200 2200 2200	2300 2300 2300 2300	α	USA, WBCQ Monticello ME USA, WBCQ Monticello ME USA, WEWN Birmingham AL USA, WHRA Greenbush ME	7415na 17495na 9975na 17650af	13615na	15375na	
2100 2100 2100	2200 2200 2200		USA, WEWN Birmingham AL USA, WHRA Greenbush ME USA, WHRI Noblesville IN	9975na 17650af 5745na	11875na 9495sa	13615na 13760na	15375na	2200 2200 2200	2300 2300 2300		USA, WHRI Noblesville IN USA, WINB Red Lion PA USA, WJCR Upton KY	5745na 13570eu 7490va	9495sa 13595as	13760na	
2100 2100 2100	2200 2200 2200		USA, WINB Red Lion PA USA, WJCR Upton KY USA, WMLK Bethel PA	13570eu 7490va 15265eu	13595as			2200 2200 2200	2300 2300 2300		USA, WRMI Miami FL USA, WSHB Cypress Crk SC USA, WTJC Newport NC	15725am 7510eu 9370na	15285sa		
2100 2100 2100	2200 2200 2200		USA, WRMI Miami FL USA, WSHB Cypress Crk SC USA, WTJC Newport NC	15725am 11550eu 9370na	15665af			2200 2200 2200 2200	2300 2300 2300	mtwhf	USA, WWCR Nashville TN USA, WWFV McCaysville GA USA, WWFV McCaysville, GA	5070am 6890va 9320va	7435am	9475am	13845am
2100 2100 2100	2200 2200 2200 2200	mtwhf	USA, WWCR Nashville TN USA, WWFV McCaysville GA USA, WWFV McCaysville GA	7435am 12172va 9320va	9475am	12160am	13845am	2200 2200 2200 2230	2300 2300 2300 2257	vl	Vanuatu, Radio Zambia, Christian Voice Czech Rep, Radio Prague Intl	3945do 4965do 7345na	4960do 9435af	7260do	
2100 2100 2100 2100	2200 2200 2200 2200	vl	USA, WYFR Okeechobee FL Vanuatu, Radio Zambia, Christian Voice	7355eu 3945do 4965do	15565af 4960do	21525af 7260do		2230 2230 2230 2230	2300 2300 2300 2300	mtwhf	Albania, R Tirana International Australia, Christian Voice Austria, R Austria International	7130eu 13780va 5945eu	9540eu 15165va 6155eu	17645va 13730af	21680va
2100 2100 2115	2200 2200 2130	vl vl mtwhf	Zambia, National BC Corp Zimbabwe, Zimbabwe BC Corp UK, BBC Caribbean Report	6165do 4828do 5975ca	6265do 6045do 11675ca	15390ca		2230 2230 2230	2300 2300 2300	vl/as vl/a	Cuba, Radio Havana Solomon Islands, SIBC Solomon Islands, SIBC	9550am 5020do 9545do			
2115 2120 2130 2130	2200 2200 200 2145	s f ff	Egypt, Radio Cairo Greece, Voice of UK, Wales Radio Intl/Merlin UK, BBC Calling Falklands	9990eu 9420au 6010eu 11680sa	15650au			2230 2245 2245 2245 2245	2300 2300 2300 2300		Sweden, Radio India, All India Radio USA, WYFR Okeechobee FL Vatican City, Vatican Radio	6065va 9705as 11740na 7305as	7235va 9950as 9600as	11620as 11830as	13605as

Frequencies

2300 2300 2300 2300 2300 2300 2300	0000 0000 0000 0000 0000 0000	vl vl vl	Anguilla, Caribbean Beacon Australia, ABC/Alice Springs Australia, ABC/Kotherine Australia, ABC/Tennant Creek Australia, Christian Voice Australia, Radio	6090am 4835do 5025do 4910do 13780va 9660pa	15165va 12080pa 9400na	17645va 17715va	21680va 17795va	2300 2300 2300 2300 2300 2300 2300 2300	0000 0000 0000 0000 0000 0000 0000		USA, WBCQ Monticello ME USA, WEWN Birmingham AL USA, WHRA Greenbush ME USA, WHRI Noblesville IN USA, WINB Red Lion PA USA, WJCR Upton KY USA, WRMI Miami FL USA, WSHB Cypress Crk SC	7415na 7425na 17650na 5745na 13570am 7490va 9955am 7510va	9385na 9495sa 13595as 15285sa	9975na 13760na	13615na
2300 2300 2300 2300 2300 2300 2300	0000 0000 0000 0000 0000 0000	vl	Cameroon, RTV/Yaounde Canada, CBC Northern Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB Canada, CHNX Halifax, NS Canada, CKZN St John's NF	4850do 9625do 6070do 6030do 6130do 6160do	7400llu			2300 2300 2300 2300 2300 2300 2300	0000 0000 0000 0000 0000 2305	vl vl	USA, WTJC Newport NC USA, WWCR Nashville TN USA, WWFV McCaysville GA Vanuatu, Radio Zambia, Christian Voice Nigeria, Radio/Enugu	9370na 3215am 5085va 3945do 4965do 6025do	5070am 6980va 4960do	7435am 7260do	13845am
2300 2300 2300 2300	0000 0000 0000 0000	67 11	Canada, CKZU Vancouver BC Costa Rica, R for Peace Intl Costa Rica, University Network Egypt, Radio Cairo	6160do 15048va 15048va 9900am	15065va 15065va	21815usb 21815usb		2300 2300 2300 2300	2305 2305 2305 2315	vl vl vl vl	Nigeria, Radio/Ibadan Nigeria, Radio/Kaduna Nigeria, Radio/Lagos Italy, IRRS	6050do 4770do 3326do 3985va	6090do 4990do	7275do	9570do
2300 2300 2300 2300	0000 0000 0000 0000	f/monthly vl vl	Finland, Scandv Weekend Radio Ghana, Ghana BC Corp India, All India Radio Liberia, R Liberia International	11690va 3366do 9705as 5100do	11720va 4915do 9950as	11620as	13605as	2300 2300 2300 2300	2315 2329 2329 2330	mtwhf	Vatican City, Vatican Radio Canada, R Canada International Canada, R Canada International Cuba, Radio Havana	7305as 5960am 6040am 9550am	9600as 9755am 11865am	11830as 11865am 13730am	
2300 2300 2300 2300	0000 0000 0000 0000		Malaysia, Radio Malaysia, RTM Kota Kinabalu Namibia, Namibian BC Corp New Zealand, ZLXA	7295do 5980do 3270af 3935do	3289af			2300 2300 2300	2330 2330 2330		Mexico, R Mexico International Mongolia, Voice of USA, VOA Special English 15395as	9705am 12015as 6045as	11770al 12085as 7140as	9545as	11925as
2300 2300 2300 2300	0000 0000 0000 0000	vl/as vl/a	Palau, KHBN/Voice of Hope Sierra Leone, Sierra Leone BS Solomon Islands, SIBC Solomon Islands, SIBC	9965as 3316do 5020do 9545do	9985as			2300 2300 2300 2300	2345 2345 2356 2359		Germany, Deutsche Welle USA, WYFR Okeechobee FL China, China Radio International New Zealand, R New Zealand Int	9470as 11740na 5990na 17675pa	9815as	13690as	17655as
2300 2300	0000		Sri Lanka, Sri Lanka BC Corp UK, BBC World Service 6175na 11955as	4940do 3915as 6195va 12095sa	5965as 7105as 15280as	5975na 9590na	6035as 11945as	2300 2330 2330	2359 0000 0000		Romania, R Romania International 11940na Canada, R Canada International Kirgiziya, Kirgiziya Radio	7195eu 5960am 4010eu	9570na 9755am	9690eu	9690eu
2300 2300	0000 0000	fa	UK, Global Kitchen/Merlin USA, Armed Forces Radio 6350va 12579va	3955eu 4278va 6458va 12689va	6170eu 4319va 6847va 13362va	7165eu 4993va 10320va 16847va	5765va 10940va	2330 2330 2330 2330 2330	0000 0000 0000 0000		Lithuania, Radio Vilnius Malaysia, RTM Sarawak Netherlands, Radio Switzerland, Swiss R International	6000na 7160do 6165na 9885sa	9875na 9845na 11660sa		
2300 2300 2300	0000 0000 0000		USA, KAIJ Dallas TX USA, KTBN Salt Lake City UT USA, KWHR Naalehu HI	13815va 15590na 17510as				2330	0000		USA, VOA Special English 9545as 15205as	6045as 9620as 15395as	7130as 11805as	7130as 11925as	7140as 13745as
2300	0000		USA, Voice of America 13690as 17740pa	7215as 15185as	9770as 15290as	9890as 15305pa	11760as 17735pa	2330 2330 2330	2345 2357 2357	vl	Libya, Voice of Africa Czech Rep, Radio Prague Intl Vietnam, Voice of	11815af 7345na 9839as	17725af 9435na 12019as		

SELECTED PROGRAMS

BBC World Service (am)

2300 S World Briefing, M-F News, A News Summany; 2301A Play of the Week (radio theatre); 2305 M-F Outlook (magazine); 2320 S Sports Roundup; 2330 S Greenfield Clacition (classical music); 2345 M Patterns of Faith, T Plain English, W Heart & Soul (religion), H Best of 'The Edge' (youth culture), F Body & Mind (health).

China Radio International

2300 D News; 2310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 2320 S In the Spotlight (cultural magazine), A Listeners' Gorden; 2330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (business), H Voices from Other Lands, E Life in China.

Radio Australia

2300 D News; 2305 F Lingua Franca (about language, A Ockham's Razor (science issue); 2310 S-H Asia Pacific (regional current affairs); 2320 F Shorn Story; 2330 S Earthbeat (ecology), M Innovations (Australian products/ingenuity), T Arts Talk, W Rural Reporter, H Media Report, F In Conversation-Science.

Radio Canada International

2300 D CBC News; 2305 S Global Village (world music), M-F As It Happens (interviews with newsmakers)[began at 2230], A Quirks & Quarks (science); 2330 W Dispatches (world events through Canadian eyes).

Radio Netherlands

2330 S/A News; M-F Newsline; 2335 S Sincerely Yours (letters), A Europe Unzipped; 2355 A Insight (commentary).

Radio New Zealand International

2300 S-H World and Pacific News, F/A RNZ News; 2310 S-H Sports News, F Saturday Night with John Campbell, A Feature or series; 2315 S-H Pacific Weather; 2317 Kim Hill (interviews/current offoirs).

WBCQ, Maine

7415 kHz.: 2300 S Le Show (humor/entertoinment), F Scream of the Butterfly, A The Real Amateur Radio Show; 2330 W World of Radio, A Fred Flintstone Music Show. 17495 kHz.: 2300 A Marion's Attic (vintage recordings).

WHRI, Indiana

5745 kHz.: 2300 F DXing with Cumbre; 2330 A DXing with Cumbre.

7315 kHz. 2300 F DXing with Cumbre; 2330 A DXing with Cumbre; 2335 F Music (Christian contemporary and gospel).

7580 kHz.: 2300 F 20 The Countdown Magazine (Christian contemporary music charts).

WWCR, Tennessee

3215 kHz.: **2330** S Ken's Country Classics 5070 kHz.: **2305** S Pat Boone Show.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

John Babbis, Silver Spring, MD; John Boynton, Newton, MA; Tom Banks, Dallas, TX; Bob Fraser, Cohasset, MA; Glenn Hauser, Enid, OK/World of Radio, DX Report; Hans Johnson, WY/Ulis Fleming, MD/Cumbre DX/DXing With Cumbre; BBCM; Robert E. Thomas, Bridgeport, CT; BBC On-Air; Harold Sellers, DX Ontario; Hard Core DX; Radio Sweden/Media Scan; Usenet Newsgroups; Worldwide DX Club.

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Satellite Service Guide



All Frequencies MHz

Robert Smathers roberts@nmia.com

G	E Ame	ricom GE-2 - C-Band
85 degi	ees West	longitude
1(V)	3720	Horse Racing (occ)
2(H)	3740	Occasional Video
3(V)	3760	RAI International (occ)/ Occasional
		Video
4(H)	3780	La Cadena de Milagro
5(V)	3800	
6(H)	3820	
7(V)	3840	
8(H)	3860	Data Transmissions
9(V)	3880	
	3900	
	3920	
	3940	
	3960	
3971.30	1178.	
		missions (missions only)
14(H)	3980	USIA Worldnet (digital)/Data Trans-
		missions
15(V)	4000	Data Transmissions
16(H)	4020	
17(V)	4040	Data Transmissions
18(H)	4060	Data Transmissions
19(V)	4080	
20(H)	4100	Data Transmissions
21(V)	4120	
٠,,	4140	Horse Racing (occ)
,	4160	Horse Racing (occ)
24(H)	4180	Horse Racing (occ)

GE Americom GE-2 - Ku-band

85 degre	es West	
1(V)	11720	Occasional Video
2(H)	11740	Occasional Video
3(V)	11760	Occasional Video
4(H)	11780	Occasional Video
5(V)	11800	Occasional Video
6(H)	11820	Occasional Video
7(V)	11840	Occasional Video
8(H)	11860	Occasional Video
9(V)	11880	Occasional Video
10(H)	11900	Occasional Video
11(V)	11920	CONUS Communications
12(H)	11940	Occasional Video
13(V)	11960	Occasional Video
14(H)	11980	Occasional Video
15(V)	12000	Occasional Video
16(H)	12020	Occasional Video
17(V)	12040	Occasional Video
18(H)	12060	Occasional Video
19(V)	12080	Occasional Video
20(H)	12100	Occasional Video
21(V)	12120	Occasional Video
22(H)	12140	Occasional Video
23(V)	12160	Occasional Video
24(H)	12180	Occasional Video

GE Americom GE-3 - C-band

87 deg	rees West	longitude
1(H)	3720	Associated Press TV (digital)/Michi-
		gan Government TV (digital)
2(V)	3740	Data Transmissions
3(H)	3760	Data Transmissions
4(V)	3780	Data Transmissions
5(H)	3800	Univision (VC2 $+$)
6(V)	3820	MSC/MSC Wisconsin (digital)/
		HTS(digital)
7(H)	3840	(none)
8(V)	3860	Data Transmissions
9(H)	3880	WPIX-TV - WB New York (VC2 $+$)

10(V) 11(H) 12(V) 13(H) 15(H) 16(V) 17(H) 18(V) 20(V) 22(V) 23(H)	4020 4040 4060 4080 4100 4120	Talk America Radio Network 2 5.41 Talk America Radio Network 1 6.80 American Urban Radio Network 6.30/6.48 (DS) (none) CNN SI Occasional Video Occasional Video Turner Classic Movies (VC2+) KTLA-TV - WB Los Angeles (VC2+) Christian Radio (digital)/Data Transmissions Fox Movie Channel (VC2+) Fox Sports Net University Network - Dr. Gene Scott CNN feeds (occ) Data Transmissions Data Transmissions
		Data Transmissions America One
٠,		

GE Americom GE-3 - Ku-Band

<i>87 degi</i> 1(H)	11720	
'('')	11/20	Faith (digital)/Data Transmissions
2(V)	11740	Data Transmissions
3(H)	11740	Bulu munomiosiono
4(V)	11780	
5(H)	11800	
6(V)	11820	
7(H)	11840	Occasional Video
8(V)	11860	
9(H)	11880	
10(V)	11900	National Technology University (digi-
10(1)	11700	tal)
11(H)	11920	Data Transmissions
12(V)	11940	Occasional Video
13(H)	11960	Occusional Maco
14(V)	11980	o ccasional viaco
15(H)	12000	
16(V)	12020	
17(H)	12040	
18(V)	12060	
19(H)	12080	PBS leased analog services (occ)
20(V)	12100	PBS (DC2)
21(H)	12120	PBS HDTV (digital)/PBS (digital)
22(V)	12140	Indiana Higher Education Telecom-
-1.7		munication Service (digital)
23(H)	12160	PBS (DC2)/Annenberg-CPB Channe
/		(DC2)
24(V)	12180	PBS (DC2)

89 degi	rees West	longitude
1(V)	3720	Gonzo X (VC2 +)/ETC (DC2)
2(H)	3740	Data Transmissions
3(V)	3760	XXXcite (VC2 +)
4(H)	3780	Extasy (VC2+)
5(V)	3800	True Blue (VC2 $+$)/TEN (DC2)/Plea-
		sure (DC2)
6(H)	3820	Occasional Video
7(V)	3840	The Erotic Networks Promotional
		Channel
8(H)	3860	ABC feeds (occ)
9(V)	3880	Occasional Video
10(H)	3900	Occasional Video
11(V)	3920	Occasional Video
12(H)	3940	ABC feeds (occ)
13(V)	3960	CBS (DC2)
14(H)	3980	ARC HDTV (digital)/ARC feeds (occ)

SXTV Promotional Channel/

16(H)	4020	Bloomberg TV (digital) Eurotica (VC2+)/Cornerstone TV	
10(11)	1020	(digital)	
17(V)	4040	Occasional Video	
18(H)	4060	PBS C-band Schedule X	S
19(V)	4080	Occasional Video	9
20(H)	4100	Occasional Video	1
21(V)	4120	ABC - West (LEITCH)	S
22(H)	4140	ABC - East (LEITCH)	1
23(V)	4160	Occasional Video	1
24(H)	4180	Occasional Video	S
			- 1

Loral Orion Telstar 4 - Ku-Band

89 degre	es West	longitude
T01(V)	11730	South Carolina Educational TV (DC2)
T02(H)	11743	Data Transmissions
T03(V)	11790	Microspace (digital)
T04(H)	11803	Data Transmissions
T05(V)	11850	Data Transmissions
T06(H)	11863	Georgia Public Television (DC2)
T07(V)	11910	Data Transmissions
T08(H)	11923	Data Transmissions
T09(V)	11971	Occasional Video
T10(H)	11984	Occasional Video
T11(V)	12033	ABC SNG (occ)
T12(H)	12046	Data Transmissions
T13(V)	12095	Data Transmissions
T14(H)	12108	Data Transmissions
T15(V)	12157	Muslim TV Ahmadiyya (digital)/DMX
		(digital)
T16(H)	12170	Occasional Video

The satellite arc listings will continue in sequence next month. Now, here is the loading report for a new satellite in the North American domestic arc:

Telesat Canada Anik F1 - C-Band

107.3 de	earees We	est longitude
		an "S" have South American beams
1A(H)	3720	(none)
S1À(Ĥ)	3720	
1B(V)		Data Transmissions
2A(H)		CBC (digital)
S2À(H)	3760	, ,
2B(V)	3780	Telesat (digital)
3A(H)		Data Transmissions
S3À(H)		
3B(V)	3820	Occasional Video
4A(H)	3840	Occasional Video
S4À(H)	3840	
4B(V)	3860	Cancom (digital)
5A(H)	3880	Occasional Video
S5A(H)	3880	
5B(V)	3900	Cancom (digital)
6A(H)	3920	CBC French (digital)
S6A(H)	3920	
6B(V)	3940	Cancom (digital)
7A(H)	3960	CBC feeds (occ)
	3944.00	1206.00 54.00
		CBC Radio - Occasional feeds
	3944.50	1205.50 54.50
		CBC Radio - North
C71/H/	3960	
S7A(H)		Cancom (digital)
7B(V) 8A(H)		Cancom (digital) Data Transmissions
		DAIR HRIIZHIIZZIONZ
S8A(H)	4000	Occasional Video
8B(V)	4020	Occusional Mago

4040 CBC feeds (occ)

4024.00 1126.00 54.00

	4024.50	CBC Radio - North) 1125.50 54.50 CBC Radio - North
S9A(H)	4040	
9B(V)	4060	Telesat (digital)
10À(H)	4080	Data Transmissions
S10A(H)	4080	
10B(V)	4100	CTV (digital)
11A(H)	4120	Occasional Video
S11A(H)	4120	
11B(V)	4140	Occasional Video
12A(H)	4160	CBC feeds (occ)
	4144.00) 1005.50 54.50
		CBC Radio - CBC Radio One
S12A(H)	4160	
12B(V)	4180	Occasional Video

Telesat Canada Anik F1 - Ku-Band

107.3 degrees W	lest
	an "S" have South American beams
T1(V) 11714	Star Choice DBS
T2(V) 11744	Star Choice DBS
T3(V) 11775	Star Choice DBS
T4(V) 11807	Star Choice DBS
T5(V) 11836	Star Choice DBS
T6(V) 11867	Star Choice DBS
T7(V) 11880	Star Choice DBS
T8(V) 11897	Star Choice DBS
T9(V) 11928	Star Choice DBS
T10(V) 11959	
T11(V) 11990	Star Choice DBS
T12(V) 12020	Star Choice DBS
T13(V) 12051	Star Choice DBS
T14(V) 12080	Star Choice DBS
T15(V) 12140	Occasional Video
T16(V) 12172	Star Choice DBS
T17(H) 11725	Star Choice DBS
T17S(H) 11725	C. Cl.: DDC
T18(H) 11756	Star Choice DBS
T18S(H) 11756	Star Choice DBS
T19(H) 11786	2101 CHOICE DB2
T19S(H) 11786 T20(H) 11817	Star Choice DBS
T20S(H) 11817	Sidi Cilotte DDS
T21(H) 11850	Star Choice DBS
T21S(H) 11850	Sidi Cilotte DDS
T22(H) 11880	Star Choice DBS
T22S(H) 11880	Stat choice bbs
T23(H) 11910	CBC feeds (occ)
T23S(H) 11910	(,
T24(H) 11940	Star Choice DBS
T24S(H) 11940	
T25(H) 11971	Star Choice DBS
T25S(H) 11971	
T26(H) 12002	Star Choice DBS
T26S(H) 12002	
T27(H) 12033	Star Choice DBS
T27S(H) 12033	
T28(H) 12063	Star Choice DBS
T28S(H) 12063	
T29(H) 12094	Star Choice DBS
T29S(H) 12094	
T30(H) 12124	Occasional video
T30S(H) 12124	
T31(H) 12155	Star Choice DBS
T31S(H) 12155	C. Cl. DDC
T32(H) 12180	Star Choice DBS
T32S(H) 12180	

See Universal Electronics ad on page 43 for satellite equipment.

15(V)

Lawrence@itchycoo-park.freeserve.co.uk http://www.itchycoo-park.freeserve.co.uk/wxsats.htm

No Pictures, Snowy Pictures & Gulf Pictures

anuary's weather satellite monitoring operations were a columnist's nightmare! Resurs unexpectedly stopped transmitting, then Meteor 2-21 stopped as well... only to resume some days later. I wanted to find someone at operational level in the Russian Control Centers who could explain what was going on, so I contacted Vitaly Ippolitov, an engineer at ScanEx, a private Russian firm that manufactures Russian satellite systems. I have previously exchanged e-mails with Vitaly, and he was happy to explain.

Resurs had indeed developed a fault. Many days later, transmissions resumed – finally breaking the streak of misfortune! The problems with APT from NOAA-15 and NOAA-16 were being actively investigated, but it coincided with periods of overlapping footprints – resulting in more satellites having automatic picture transmissions (APT) terminated. For several days, only NOAA-12 and NOAA-14 were transmitting APT!

How fortunate that despite problems with all APT constellations, the geostationary WXSATs – GOES-8 and GOES-10 for continental USA – remained in full operation.

A positive side to snowy pictures

I spent some time looking at the amounts of snow revealed in HRPT images from the operational NOAAs. One snowfall, and the television media was full of pictures of traffic at a stand-still! Al-

Hundreds of oil wells continue to burn out of control after being set ablaze in early part of February. Sixes are filled with thick black smoke, which haveled for hundreds of miles south and Azaba where the words appear to be lighter and shifting more from the east. The red areas at the base of the smoke plumes indicate heat signatures.

Kuwalt

Heat Signatures.

Kuwalt

Persian
Gulf

Persian
Gulf

NOAA-11 1 km AVHRR
Multi-spectral False Color Image (chif=ib|tte), chi2 green, ch3=red)
March 11, 1991 @ 1014 UTC

Fig 1: Burning oil fires in Kuwait on March 11, 1991, HRPT by NOAA-11 courtesy NOAA.

though we expect snowfalls to occur during winter, particularly in more northern latitudes, it seems to take very little to nearly paralyze neighborhoods.

A NASA satellite confirmed that this winter was snowier than usual. "Composite data from NASA's Terra satellite show that this winter brought more snow-cover in the early part of the season than average," said Dorothy Hall of NASA's Goddard Space Flight Center. Results from the Moderate Resolution Imaging Spectro-radiometer (MODIS) aboard Terra clearly observed more snow-cover in the Midwestern and Western United States in November and December. Complementing the snowfall were record cold temperatures for November and December 2000 throughout the United States, according to the National Oceanic and Atmospheric Administration (NOAA).

NOAA/NESDIS has been producing weekly snow maps of Northern Hemisphere land surfaces since 1966 using visible-band satellite imagery. Snow has such a high reflectivity compared to other surfaces on Earth, that snow-covered areas appear much brighter in satellite imagery than most other surface types. More than 40 percent of the Earth's land surface in the Northern Hemisphere can be covered with snow during the winter months.

The highly reflective nature of snow combined with its large surface cover make it an important factor in the Earth's radiation balance, which includes incoming solar energy and energy reflected

back into space. NOAA satellites measure radiation in six bands that help to accurately determine snow coverage. According to the National Snow and Ice Data Center, snow may reflect up to 80 and 90 percent of incoming solar energy, whereas a surface without snow would only reflect 10-20 percent.

Many areas of the world rely on the snowmelt for irrigation and drinking water. In the western U.S, mountain snowpacks contribute up to 75 percent of all year-round surface water supplies. Therefore, it is necessary to monitor snowpacks closely throughout the winter and spring for assessment of water supply and flooding potential, and MODIS data will prove useful in this capacity.

Sample MODIS imagery is available at: http://nsidc.org/ NASA/MODIS/

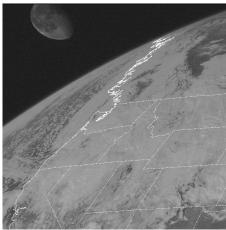


Fig 2: GOES-8 imaging the Moon January 13, 2001, 2032 UTC from Joseph Gresham. During its monthly passage around the earth, the Moon is occasionally imaged by GOES. Such an event is seen in figure 2.

Ten years ago

I vividly recall the events of the Persian Gulf War back in 1991, so NOAA's recent decision to release some high resolution images taken by NOAA-11 – see figure 1 - was of great interest. At that time, I had wondered whether wxsat images were likely to be of military significance – and pointed out wefax and APT resolution levels to a reporter friend.

A few hours later, I regretted doing that! There was considerable interest from the local media, and my humble desk and computer, together with my homebrew wefax dish out in the yard, were photographed until there was no unexplored angle remaining. I did explain that many hobbyists around the country — not to mention the world — had wefax reception stations. However, it left the news head-lines after a week or two.

Frequencies

NOAA-15 and NOAA-16 has unresolved APT faults.

NOAA-14 transmits APT on 137.62 MHz

NOAA-12 transmits APT on 137.50 MHz

Meteor 3-5 may transmit APT on 137.30 MHz when in sunlight

Resurs 1-4 transmits APT on 137.85 Hz

Okean-0, Okean -4 and Sich-1 sometimes transmit APT on 137.40MHz GOES-8 and GOES-10 use 1691 MHz for WEFAX

See Swagur's ad on page 89 for weather satellite equipment.

A GUIDE TO GOVERNMENT COMMUNICATIONS

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Monitoring a Space Outpost

s the tempo of operations aboard the International Space Station (ISS) Alpha continues to increase, so does the number of communications systems used by expedition crew members aboard the space outpost. These systems are primarily managed by the United States and Russia. Some of the ISS downlink frequencies fall within federal frequency bands.

As of press time the bulk of the communications systems transmitting from the ISS are of Russian origin and a couple of these systems are easily monitored on public safety scanner radios. In fact, one of the VHF downlinks is easily heard on a handheld scanner or ham transceiver with a rubber duck antenna.

I have also included some other support networks including a completely revised profile of the space shuttle communications systems. The shuttle is the main space truck used to haul equipment and space modules to this space outpost.

If you want more information on NASA field sites and other space related communications systems, you can find the most comprehensive list of NASA and space shuttle communications frequencies and systems in the *Monitoring Times* section on the Grove Enterprises website (http://www.grove-ent.com). I update this information frequently so check back often for new information and frequencies.

International Space Station Communication and Tracking Systems (C&TS)

US On-Orbit Segment (USOS)

ISS Alpha/TDRSS S-band frequencies — 2265.0/2085.680 MHz
(Note: Any additional information on the frequencies used by
the USOS would be most welcome. Contact the author at
larry@grove-ent.com.)

Russian Orbital Seament (ROS)

Zarya ISS Control Module
Zarya BITS Telemetry System — 632/634 MHz (PCM/FM)
TORU Rendezvous Control System (Zarya/Progress) — 130.167/
121.750 MHz

Complete information on the TORU rendezvous control system can be found at Sven Grahn's Space website at: http://www.users.wineasy.se/svengrahn/trackind/TORU/Toru.html

Zvezda ISS Service Module

EVA Data System — 247.0/231.0 MHz EVA Voice System (Simplex/Duplex) — 121.750 MHz (EVA-1)/ 130.167 MHz (EVA-2) Internal Wireless System — 463/420 MHz (Video) The ROS Television subsystem collects video during EVA activities and aids in the control of approach/docking vehicles both manned and unmanned. It receives TV video from various modules and displays TV pictures on monitors throughout the ROS. This system does *not* use the US NTSC video standard

Kurs Rendezvous Docking Radar — 3294/3300 MHz This radar system has a 20 MHz bandwidth and the Zvezda module uses a passive reflector

Lira System — 13511-13545 MHz LHCP/15130-15180 MHz RHCP (Data)

Lira provides two-way, high speed radio communications with ground stations through the Luch Relay satellite system.

Luch Relay Satellite System — 900/700 MHz, 13511-13545 MHz LHCP/15130-15180 MHz RHCP Data, 10810-10860 MHz RHCP/14591-14625 MHz LHCP

Regul (Kvant) System — 922.760/768.975 MHz

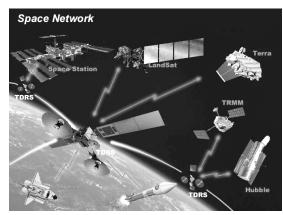
Regul is designed for two-way voice communications, digital command/program info, as well as telemetry transmission to Russian ground stations or the Luch satellite.

TORU Rendezvous Control System (Zvezda/Progress) — 130.167/ 121.750 MHz

Tracking System — 2860 MHz/2725 MHz (Pulse Modulation)
Voice Downlink Primary (VHF-1) — 143.625/139.208 MHz (FM)
Voice Downlink Backup (VHF-2) — 121.750/130.167 MHz (FM)

VHF-2 is part of the telemetry, tracking and control subsystem and is used primarily for space-to-space communication. Communications with EVA astronauts is via VHF-2. This is the equivalent system to the Space Shuttle UHF EVA military system.

Zvezda BITS Telemetry System — 628/630 MHz (PCM/FM 256 kbps)



Ku-band System — 15.0034 GHz (Orbiter to TDRS)/13.755 GHz (TDRS-to-Orbiter)

S-band DoD Phase Modulation (PM) forward link (uplink) — 1831.787 MHz (Primary SGLS channel 18)/1775.732 MHz (Secondary SGLS channel 4)

S-band Frequency Modulation (FM) return link (downlink) — 2250.0 MHz (Voice, Data, Video)

S-band Phase Modulation (PM) forward link (uplink) — 2106.4 MHz (Primary)/2041.9 MHz (Secondary)

S-band Phase Modulation (PM) return link (downlink) — 2287.5 MHz (Primary SGLS channel 18)/2217.5 MHz (Secondary SGLS channel 4)

UHF Air-to-Ground voice downlink (AM) — 259.700 MHz (Primary)/ 296.800 MHz (Secondary)

UHF Emergency only (AM) — 243.000 MHz

UHF EVA downlink (new system) — sources indicate several unknown discrete frequencies within the 410.000-420.000 MHz range. UHF EVA voice orbiter only, no ground link (AM) — 279.000 MHz

Amateur Radio International Space Station (ARISS) Information

Callsigns in use on the ISS Alpha:
United States Callsign — NA1SS
Russian Callsign — RZ3DZR
Packet station mailbox callsign — RZ3DZR-1
Packet station keyboard callsign — RZ2DZR
Astronaut William Shepherd — KD5GSL
Sergei Krikalev — U5MIR

Worldwide downlink — 145.800 MHz (NFM/Packet) Worldwide uplink — 145.990 MHz (Packet) Region 1 voice uplink — 145.200 MHz (NFM) Region 2/3 voice uplink — 144.490 MHz (NFM)

Space Shuttle Communications Systems

Amateur SAREX downlink — 145.840 MHz (FM)

NASA/ESA General Frequencies

Emergency Nets — 3385 3395 4604.5 6982.5 14455 (kHz and USB) ESA Satellite TV Broadcast

Eutelsat 2 F4 (10° E) 11.134 GHz (H) MPEG-2 (4:2:0), 5.632 Msymb/sec, FEC 3/4

NSS-K Satellite (21°W) 11.465 GHz (V) 5632 Msymbl/sec, FEC 3/4 HF Ar-to-Ground — 3089.5 6743.5 9003.5 11192.5 15062.5 (All kHz and USB)

NASA Air-to-Air — 123.050 123.125 (T-38 Interplane) 123.350 230.650 235.400 (T-38 Interplane) (All MHz and AM)

NASA NCS HF net — 2360 3379 3388 5403.5 5821 5961 6106 6108 6809 9462 11801 12129 12219 13633 13744 13780 14836 14989 14908 15464 16201 16430 18744 20063 22983 23390 (All kHz and USB)

NASA Nationwide Assignments — 162.1125 162.9875 163.100 166.525 166.8375 167.0125 167.350 167.400 167.775 168.350 168.4125 168.9375 169.2125 171.5125 171.6375 172.0375 172.3375 172.9625 173.425 173.900 (All MHz and NFM)

NASA Satellite TV Broadcast
GE-2 (85°W) 3880 MHz (V) transponder 9C, 6.8 MHz mono audio
NTSC video
NASA/USAF Space Ground Link Subsystem (SGLS):
Uplink (MHz) Channel Downlink (MHz)
1763.7210 Channel 01 2202.5
1767.7250 Channel 02 2207.5
1771.7290 Channel 03 2212.5
1775.7320 Channel 04 2217.5
1779.7360 Channel 05 2222.5
1783.7400 Channel 06 2227.5
1787.7440 Channel 07 2232.5
1791.7480 Channel 08 2237.5
1795.7520 Channel 09 2242.4
1799.7560 Channel 10 2247.5
1803.7600 Channel 11 2252.5
1807.7640 Channel 12 2257.5
1811.7680 Channel 13 2262.5
1815.7710 Channel 14 2267.5
1819.7750 Channel 15 2272.5
1823.7790 Channel 16 2277.5
1827.7830 Channel 17 2282.5
1831.7870 Channel 18 2287.5
1835.7910 Channel 19 2292.5
1839.7950 Channel 20 2297.5

Search and Rescue Operations: 282.8 MHz (AM)

Solid Rocket Booster (SRB) Recovery Beacons: 240.0 242.0 MHz (Data)

Shuttle Emergency Landing Site Net: 408.150 408.800 MHz (NFM)
Shuttle Launch Support INMARSAT Nets (Reported frequencies from
the 15.5 deg west Atlantic satellite): 1535.250 1535.500
1535.700 1535.975 1537.175 1537.975 1538.325 1538.750
(KSC Audio) 1540.375 1540.425 (KSC Audio) 1540.7750
1541.075 MHz (All NFM) Note: You can learn more about monitoring INMARSAT satellites at the URL http://www.time-step.com/reviews/mt inmarl.htm

Shuttle Launch Support Net (UHF military satellites): 261.750 261.800 261.950 263.625 MHz (All NFM) The most frequently reported UHF satellite frequencies are listed above.

Space Flight Tracking and Data Network

The primary network for operating, maintaining and controlling the Space Shuttle is the Space Flight Tracking and Data Network (STDN). Goddard Space Flight Center runs the STDN and the ground tracking stations that support this network are located throughout the world.

Ascension Island (ACN) — S-band and UHF air-to-ground.
Bermuda (BDA) — S-band, C-band and UHF air-to-ground.
Canberra, Australia (CAN) — S-band
Dakar, Senegal — UHF air-to-ground
Guam (GWM) — S-band and UHF air-to-ground
Kauai, Hawaii (HAW) — S-band and UHF air-to-ground
Merritt Island, Fla. (MIL) — S-band and UHF air-to-ground
Ponce de Leon, Fla. (PDL) — S-band
Santiago, Chile (AGO) — S-band
Wallops, Va. (WFF) — C-band

And that is it for this month's edition of *The Fed Files*. Now it is time to look at this month's federal spectrum scan in Table One. In this issue we continue our detailed look at the reorganized 406-420 MHz UHF federal land mobile service. 73 and good hunting.

Table One: Federal UHF Land Mobile Service

Frequency 412.0000	<i>Ch/Paired Freq*</i> 472/Simplex	Agencies Drug Enforcement Agency, Energy Department,	412.4875 412.5000	511/Simplex 512/Simplex	(No reported activity) FBI (Nationwide)
412.0125	473/Simplex	Geologic Survey (Nationwide), Interior Depart- ment (Nationwide), NASA, Post Office, TVA (No reported activity)	412.5125 412.5250 412.5375	513/Simplex 514/Simplex 515/Simplex	(No reported activity) Drug Enforcement Agency, FBI (Nationwide) (No reported activity)
412.0250	474/Simplex	Bureau of Land Management, Bureau of Reclamation, Interior Department (Nationwide),	412.5500 412.5625	516/Simplex 517/Simplex	FBI (Nationwide) (No reported activity)
412.0375	475/Simplex	Post Office, TVA, US Information Agency (No reported activity)	412.5750 412.5875	518/Simplex 519/Simplex	FBI (Nationwide), Navy (No reported activity)
412.0500	476/Simplex	Bureau of Land Management, Energy Depart-	412.6000	520/Simplex	Agriculture Department (Nationwide), Agricul-
		ment, Interior Department (Nationwide), International Boundary and Water Commission,			ture Research Service, Forest Service (Nation-wide)
412.0625	477/Simplex	NASA, Navy (No reported activity)	412.6125 412.6250	521/Simplex 522/Simplex	(No reported activity) Hydrologic Channel (center frequency): US Gov-
412.0750	477/Simplex 478/Simplex	Bureau of Land Management, Bureau of Reclamation, Geologic Survey, Interior Department (Nationwide), National Park Service, TVA	412.0230	322/ Simplex	ernment/Non-Government Agencies (12.5 kHz or greater simplex only) [authorized for use until December 31, 2007]
412.0875	479/Simplex	(No reported activity)	412.6375	523/Simplex	(No reported activity)
412.1000	480/Simplex	Bureau of Land Management, Interior Depart- ment (Nationwide), National Park Service	412.6500	524/Simplex	Energy Department (Nationwide), FBI, Marshal Service (Nationwide)
412.1125 412.1250	481/Simplex 482/Simplex	(No reported activity) Bureau of Land Management, Drug Enforcement Agency, Energy Department, Interior De-	412.6625	525/Simplex	Hydrologic Channel (center frequency): US Gov- ernment/Non-Government Agencies (simplex only)
		partment (Nationwide), International Bound-	412.6750	526/Simplex	Hydrologic Channel (center frequency): US Gov-
		ary and Water Commission, National Park Service, TVA, Veterans Administration			ernment/Non-Government Agencies (simplex only)
412.1375	483/Simplex	(No reported activity)	412.6875	527/Simplex	Hydrologic Channel (center frequency): US Gov-
412.1500	484/Simplex	Bureau of Land Management (Nationwide), Interior Department (Nationwide)			ernment/Non-Government Agencies (simplex only)
412.1625 412.1750	485/Simplex 486/Simplex	(No reported activity) Bureau of Indian Affairs, Bureau of Mines (Na-	412.7000	528/Simplex	Energy Department (Nationwide), Marshal Service (Nationwide)
112.1750	100/ Simplox	tionwide), Interior Department (Nationwide), In-	412.7125	529/Simplex	Hydrologic Channel (center frequency): US Gov-
412.1875	487/Simplex	ternational Boundary and Water Commission (No reported activity)			ernment/Non-Government Agencies (simplex only)
412.2000	488/Simplex	Bureau of Land Management (Nationwide), Interior Department (Nationwide)	412.7250	530/Simplex	Hydrologic Channel (center frequency): US Government/Non-Government Agencies (simplex
412.2125	489/Simplex	(No reported activity)			only)
412.2250	490/Simplex	Bureau of Land Management, Bureau of Reclamation, Energy Department, Interior Depart-	412.7375	531/Simplex	Hydrologic Channel (center frequency): US Gov- ernment/Non-Government Agencies (simplex
410.0075	401./C: I	ment (Nationwide), IRS	410.7500	500 /C: I	only)
412.2375 412.2500	491/Simplex 492/Simplex	(No reported activity) Bureau of Land Management, Bureau of Rec-	412.7500	532/Simplex	Energy Department (Nationwide), Navy, Post Office
410.0/05	400 /C: I	lamation, Interior Department (Nationwide), NASA, TVA	412.7625	533/Simplex	Hydrologic Channel (center frequency): US Government/Non-Government Agencies (simplex
412.2625 412.2750	493/Simplex 494/Simplex	(No reported activity) Army, Bureau of Indian Affairs, Geologic Sur-	412.7750	534/Simplex	only) Hydrologic Channel (center frequency): US Gov-
	, , , , ,	vey (Nationwide), Interior Department (Nation- wide), Post Office			ernment/Non-Government Agencies (simplex only)
412.2875	495/Simplex	(No reported activity) Bureau of Land Management, Bureau of Rec-	412.7875	535/Simplex	(No reported activity)
412.3000	496/Simplex	lamation, Energy Department, Interior Department (Nationwide), Navy, TVA	412.8000	536/Simplex	Agriculture Department (Nationwide), Army, Federal Grain Inspection Service (Nationwide), Food Safety and Inspection Service, Forest Ser-
412.3125 412.3250	497/Simplex 498/Simplex	(No reported activity) NOAA (Nationwide), National Bureau of Stan-	412.8125	537/Simplex	vice, Veterans Administration (No reported activity)
		dards (Nationwide)	412.8250	538/Simplex	Government Itinerant: wide area, common use
412.3375 412.3500	499/Simplex 500/Simplex	(No reported activity) Bureau of Reclamation, Energy Department,	412.8375	539/Simplex	simplex (Nationwide) Government Itinerant: wide area, common use
		Federal Reserve System, FEMA, Interior Depart- ment (Nationwide), National Park Service, Post	412.8500	540/Simplex	simplex (Nationwide)
		Office, TVA		•	Government Itinerant: wide area, common use simplex (Nationwide)
412.3625 412.3750	501/Simplex 502/Simplex	(No reported activity) Bureau of Indian Affairs, Bureau of Land Man-	412.8625	541/Simplex	Government Itinerant: wide area, common use simplex (Nationwide)
	,.	agement, Bureau of Mines, Bureau of Recla- mation, Energy Department, Interior Depart-	412.8750	542/Simplex	Government Itinerant: local area, common use simplex (Nationwide)
		ment (Nationwide), National Park Service, TVA, US Information Agency	412.8875	543/Simplex	Government Itinerant: local area, common use simplex (Nationwide)
412.3875	503/Simplex	(No reported activity)	412.9000	544/Simplex	Government Itinerant: local area, common use
412.4000	504/Simplex	Agriculture Department (Nationwide), Agricul- ture Research Service, Animal and Plant Health	412.9125	545/Simplex	simplex (Nationwide) Government Itinerant: local area, common use
		Inspection Service, FBI (Nationwide), Federal Grain Inspection Service, Food Service and In-	412.9250	546/Simplex	simplex (Nationwide) Air Force (Nationwide), Army (Nationwide),
410 4105	505.60	spection Service, Forest Service, Navy		•	Corps of Engineers, Customs Service
412.4125 412.4250	505/Simplex 506/Simplex	(No reported activity) Bureau of Prisons, Energy Department, FBI (Na-	412.9375 412.9500	547/Simplex 548/Simplex	(No reported activity) Air Force (Nationwide), Army (Nationwide),
		tionwide)		•	Corps of Engineers, Navy
412.4375 412.4500	507/Simplex 508/Simplex	(No reported activity) Drug Enforcement Agency, FBI (Nationwide)	412.9625 412.9750	549/Simplex 550/Simplex	(No reported activity) Air Force (Nationwide), Army (Nationwide),
412.4625	509/Simplex	(No reported activity) Bureau of Prisons, Drug Enforcement Agency,			Navy
412.4750	510/Simplex	Energy Department, FBI (Nationwide), Post Of-	412.9875	551/Simplex	(No reported activity)
		fice			

dan@signalharbor.com

Motorola Type II Trunking

ith all of the various trunk-tracking scanners and software out there it is sometimes difficult to make sense of talkgroup numbers and understand why they occasionally change during a conversation. This month we'll take a look at Motorola Type II talkgroups and the different ways they can be displayed. We'll also report on a new radio system being built by Motorola for the state of Illinois.

Type II Talkgroups

Since your site seems to be becoming something of a collection point for tiny bits of the trunked jigsaw, if you are interested, the codes showing up on my 780 for Palm Springs Police Department in California are:

32784 - main channel 32816 - secondary 32912 - surveillance

There are batches of other things ranging from the Airport to the dogcatcher but I haven't logged them down. The reason I note the above numbers is that they are distinctly different from those shown in the Uniden/Bearcat booklet which are in the format 200-13, 400-04, etc.

Regards, David

David, congratulations on your purchase of a Uniden 780XLT scanner. Although the manual for the scanner is pretty good, there is often confusion about the way a talkgroup may be displayed.

The City of Palm Springs, California, is listed as having a Motorola hybrid system, which means it carries both Type I and Type II traffic. Apparently the Police Department uses Type II radios and the other city services use Type I. Five frequencies are licensed to the city, namely 857.4875, 858.4875, 858.9625, 859.4875 and 860.7125 MHz.

Type I and Type II transmissions both use sixteen binary digits, or bits, to represent a

Type I

Block	Fleet	Subfleet	Unit ID
		16	

Type II

Talkgroup ID	Status Bits
12	4

talkgroup. These bits are sent out with every repeater transmission and are interpreted by your scanner.

A Type I system divides up those 16 bits into blocks, fleets, subfleets, and users. Talkgroups in Type I systems are usually displayed as FFF-SS, where FFF is a Fleet ID and SS is a subfleet ID. The trick with Type I systems is determining exactly how a particular system divides up those 16 bits. That information is represented by a fleet map, which I described in detail in the August 2000 *Tracking the Trunks* column. (Back issues of *Monitoring Times* are \$4.50 from Grove Enterprises 800-438-8155 and previous *Tracking the Trunks* columns are on my website at http://www.signalharbor.com.)

Status Bits

A Type II system divides the 16 bits differently than a Type I system. The 16 bits in a Type II system are split into 12 bits of talkgroup identifier and 4 status bits. The status bits identify special situations and are usually all zeroes.

Kignt-most		
Status Bits	Decimal	Meaning
000	0	Normal transmission
001	1	Fleet-wide (A talkgroup for all radios)
010	2	Emergency
011	3	Crosspatch between talkgroups
100	4	Emergency crosspatch
101	5	Emergency multi-select
110	6	Unknown
111	7	Multi-select (initiated by the dispatcher)

The three right-most status bits indicate if the message is an emergency and whether the talkgroup is interconnected in some way. The left-most status bit indicates whether or not the transmission is encrypted using the Data Encryption Standard (DES). A zero bit means the message is not encrypted and a one bit means it is encrypted. For example, a normal message has status bits of 0000 (0 in decimal). If that transmission was encrypted, it would have status bits of 1000 (8 in decimal). An emergency message that is not encrypted has status bits of 0010 (2 in decimal), while an encrypted emergency message would have status bits of 1010 (10 in decimal). Note that an encrypted message implies that it is in digital format and that it will come out of your scanner as a harsh buzzing sound instead of the radio user's voice.

The complete set of sixteen bits that make

up a talkgroup can be displayed a number of ways. They can be shown as a decimal number, like 32784 or 59216. They may also appear as hexadecimal numbers, such as 801 or E75.

The conversion between decimal and hexadecimal is straightforward. The easiest way is to use a scientific calculator, and it just so happens that one comes with Microsoft Windows. In Windows, Press the Start button, select Programs and then Accessories. Click on the Calculator selection to start the Windows calculator program. Once the calculator program is running, you'll need to switch from Standard to Scientific mode, which you can do by clicking on "View" in the menu bar and choosing "Scientific."

The scientific calculator has quite a few buttons, but we're only interested in the selections in the upper left-hand side just below the display. The program starts out with "Dec" (decimal) option selected, meaning the display will show numbers in the usual decimal format.

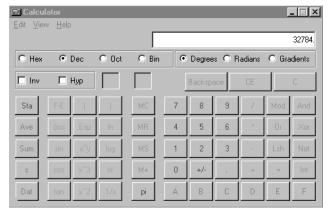
In David's example, the main channel has a decimal talkgroup of 32784. So, in the calculator we enter 32784 and then select the "Hex" (hexadecimal) option. The display changes to show 8010. Each hexadecimal digit represents four bits of the talkgroup number, with the last digit representing the status bits. Because the last four bits are zero for a normal talkgroup, many listings drop the last digit of the hexadecimal number. In David's example the talkgroup would be represented in hex as 801.

We can also view the same number in binary by choosing the "Bin" option. 32784 is equivalent to 1000 0000 0001 0000. These are the sixteen bits that make up the Type II talkgroup. The last four bits are all zero, meaning the status bits are indicating this ID is a normal talkgroup.

In fact, the status bits in each of the three talkgroups David mentions are all zero:

Decimal	Hexadecimal	Binary
32784	8010	1000 0000 0001 0000
32816	8030	1000 0000 0011 0000
32912	8090	1000 0000 1001 0000

Interesting things happen when the status bits are something other than zero. If, for example, the Palm Beach surveillance talkgroup of 32912 had an emergency message, the status bits would change from 0000 to 0010, so the sixteen bits of the talkgroup then become 1000 0000 1001 0010. If we put this binary number into the calculator and convert it to decimal, we



find the new decimal number to be 32914.

Some scanners may be preset to ignore status bits in a Motorola system and always report the same talkgroup no matter what happens. This feature may have to be disabled in order to figure out Type I fleet maps, but is handy for following Type II conversations.

Other scanners will always display the full talkgroup number, which may change during a conversation depending on the status bits. This can cause the scanner to miss conversations if each of the possible talkgroups are not programmed into the scan list.

To sum up for David, the numbers he's reporting are valid Type II talkgroups from the Palm Springs Police Department. The other numbers in the format FFF-SS are talkgroups from the other Type I radios that share the hybrid system.

Illinois Starcom 21

Dan, I read your pages in Monitoring Times January 2001 and decided to drop you a line. I got this information from a local newspaper just last week. Illinois Governor Ryan announced a \$25 million grant for a new radio system phased in over the next 3 years. The state will lease time on the new Starcom 21 network from Motorola. It will be made available to other federal, state, and local public safety agencies if they want to update their own outmoded systems.

Reading between the lines, I would say the state police are going to phase out their low band radio system statewide. Also I would assume the Illinois Department of Transportation 47 MHz system will follow also. The VHF 155 MHz state police frequency will have to stay in place for use with other police departments (ISPERN, IREACH etc.) As we already know the state

police districts in the Chicago area are already using 800 MHz

I don't know anything about Starcom21-is there a scanner yet that will work with this system? Or is this digital? Maybe a competitive brand two-way radio down the road properly programmed will be around. At the rate everyone is going, no one will be left on lowband. I've always said give 29.7 - 54 MHz to us hams (we like skip conditions) and trade part of the 440 MHz and also

1.2 GHz for commercial use (they don't like skip).

Daryl

Thanks for the information, Daryl. Funding for the Starcom 21 network comes out of the Venture TECH fund from the Illinois Technology Office. This fund promises to provide research and development dollars for a number of law enforcement initiatives, including expansion of the Illinois State Police Wireless Information Network, wireless access to photographic images and fingerprints, more rapid access to wants and warrants databases, and an automated voice dispatch system. The new Starcom 21 network is one of those initiatives.

Motorola, headquartered in the Chicago suburb of Schaumburg, was selected to build Starcom 21after a competitive bid process. The Illinois State Police will purchase new radios and lease airtime on the network, as will other federal, state, and local public safety agencies. Rather than spending a lot of money to establish their own independent systems, county and local agencies will have the option of joining the state network.

The plan is to phase in the network over three years, starting with coverage in the southern part of the state and moving northward. The state hopes that by having one common radio system, problems of interoperability – the ability of agencies to communicate directly with each other – will be a thing of the past.

As Daryl noted, the Chicago District of the Illinois State Police is currently using a trunked radio system. It's actually two EDACS networks, one covering a northern patrol area and the other a southern patrol. Frequencies in LCN (Logical Channel Number) order are:

_ | X <u>E</u>dit <u>V</u>iew <u>H</u>elp 8010 O Oct C Bin Dword C Word C Byte 8 9 Sta 4 5 dms 6 1 2 3 0 +/-В D Ε

North: 866.8875, 866.4625, 867.3875, 866.9625, 867.4625, 867.8875, 868.3875, 868.4625, 868.8875 and 868.9625 MHz.

South: 866.4125, 866.4375, 866.9375, 867.4125, 867.9375, 867.9125, 868.4375, 868.4125, 868.9375 and 868.9125 MHz.

Unfortunately, I don't have any technical details about the Starcom 21 system. I expect that it will be a trunked digital system, but I don't know if it will be compatible with other Motorola products or with the APCO 25 standards, or something altogether new. If readers have any further information about the system, please send it along!

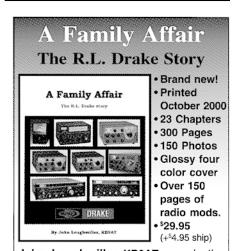
NPSPAC

Starcom 21 will almost certainly have the capability of operating on the National Public Safety Planning Advisory Committee (NPSPAC) 800 MHz frequencies. The NPSPAC was formed more than ten years ago to provide guidance in the use and coordination of public safety radio frequencies, and their recommendations included the establishment of common interagency frequencies.

Five channels in the 800 MHz band are set aside for mutual aid across the country. One frequency, 866.0125 MHz, is designated a calling channel. The other four, at 866.5125, 867.0125, 867.5125 and 868.0125 MHz, are tactical channels. Each of these channels is 25 kHz wide and operates conventionally (that is, not trunked) with a tone coded squelch frequency of 156.7.

So, as you're scanning the 800 MHz band, be sure to include these five non-trunked frequencies in one of your scan banks.

That's all for this month. More information is available on my website at http://www.signalharbor.com, and I welcome your e-mail at dan@signalharbor.com. Happy monitoring!



John Loughmiller KB9AT reveals the behind-the-scenes history of the famous R.L. Drake Company, focusing on the glory days, when Drake was king in amateur radio. Every ham and SWL knew R.L. Drake from the outside, but now the inside story of this incredibly interesting company is told. This book also includes 150 pages of useful circuits and modifications for many Drake amateur radios. An entertaining read and a great technical reference for every Drake owner.



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Richmond to Sacramento

elcome aboard everyone! Today we are going to look at frequencies for Richmond (Virginia) International Airport and visit Sacramento (California) International Airport ATC Tower.

Richmond International Airport

These frequencies were contributed by Richard Rowland

Tower and related operations:

40.200 (FM) - Army National Guard

118.2/371.100 — Final Approach

119.150/266.600 - ATIS

121.100/257.800 - Tower

121.500/243.000-Emergency/Distress

121.900/348.600 — Ground

121.100/255.400 — FSS Leesburg Radio (FSS-Flight Service Station)

122.200/255.400 — FSS Leesburg Radio

122.400/255.400 — FSS Leesburg Radio

122.950 — UNICOM

126.400/319.800 - Approach/Departure 360 - 170 degrees

126.800/398.200 — Approach/Departure 171 — 263 degrees

127.550/348.600 - Clearance Delivery

132.850/257.750 - Approach (+50 miles out)

134.700/307.200 — Approach/Departure 264-359 degrees

141.600/289.300 (AM) - 192FW Air National Guard Operations (Doghouse/Fury Ops)

Airline Frequencies

129.300 — United

129.325 — American

129.575 - Northwest

129.750 — US Airways

129.800 — US Airways/USAir Express

129.925 — Continental

130.800 - TWA/Trans States

130.950 — American Eagle

131.100 — US Airways/US Air Express

131.200 — Continental

131.450 - Delta/ComAir

131.775 — United Express

136.500 — United Express

ACARS Frequencies

129.125

130.025

131.550

136.850

136.900 136.975

FBOs (Fixed Base Operation)

122.950 — Aero Industries (FBO) RIC UNICOM

129.950 — Phillip Morris "Papa Mike"

130.275 — James River Corporation

130.300 — Million Air (FBO)

130.775 - CSX

131.425 — Richmond Jet Center (FBO)

128.850 — Airborne Express (callsign ABEX) 129.425 — UPS/Ryan/Emory/Airborne Express 131.925 — Federal Express (callsign FEDEX)

Airline and FBO Ground Ops

151.925 - Million Air (FBO)

165.237 — U.S. Customs

172.850 - FAA

460.650 — Continental

460.675 - Northwest

460.725 - United

460.775 — American

460.800 — USAirways

460.850 - Delta

452.025 — Aero Industries

Law Enforcement

122.925 — Metro Police ("Metro")

Thanks, Richard!

Sacramento International Airport

Many thanks to Bill Silaghi of Sacramento ATC Tower for permission to use the following information. Visit the tower website at http://hometown.aol.com/ smfnatca1/smfpage1.htm

Sacramento International Tower

121.100 - Clearance (frequently combined with ground)

 $121.700-Ground\ Control$

125.700/128.600 - Tower (128.600 - Intermittent use)

 $126.750-\mathrm{ATIS}$

UHF - 256.700

Company and Other Aviation Frequencies

SMF UNICOM — 122.950: General Aviation and Ramp Services

 ${\it Citation}-123.375{:}\ {\it Cessna}\ {\it Citation}\ {\it Service}\ {\it Center}$

129.500 — United Airlines (Also used by United Express; also uses Data Link)

129.600 - Northwest (Also uses Data Link)

130.100 - Delta (Also uses Data Link)

130.150 - American (Also used by TWA; also uses Data Link)

130.175 - America West (Also used by Continental)

131.625-DHL

131.700 — Southwest

131.925 — FedEx (Also uses Data Link)

132.000 - Alaska (Also used by Horizon)

135.850 — FAA Flight Inspection Area Office

Sacramento Mather Tower

ATIS - 118.325

Tower - 120.650/282.250

Ground -121.850/307.900

Sacramento Executive Tower

Tower - 119.500/381.600 Ground -125.000

ATIS - 125.500

Beale AFB Tower

Tower - 119.400/276.150 Ground -121.6/228.400

ATIS - 273 5

Sacramento Approach Control (TRACON)

Northeast -119.100//269.0

Southwest -125.250/257.900

South -125.600/360.800 (Used when SMF is on 34, above 4000')

Southeast -127.400/317.500 Northwest -134.800/271.300 Beale -125.400/327.500

Mather -123.700/259.100 (Used when MHR traffic warrants)

Travis Approach Control

South - 126.600/291.000 North - 119.900/371.200 Arrival - 128.400/294.700

Stockton Approach Control

South Low - 120.950/269.450 (6000' and below, south of Modesto) West Low - 123.850/278.300 (6000' and below, west of Manteca

East Low - 125.100/363.200 (6000' and below, east of Manteca VOR)

High - 127.750/288.300 (Above 6000')

Oakland Center

Southwest - 119.475/380.300

West High - 125.850/323.000 (Above 7000')

Southeast - 126.850/319.900

West Low - 127.800/353.500 (7000' and below)

Northeast - 127.950/316.100 Northwest - 132.200/350.300

Sacramento International Airport Tower

What We Do: The controllers at SMF ATCT provide air traffic services to aircraft operating with the Class C Surface Area and on the airport's movement area. To provide these services the controllers use radar, visual observation and position reports. Classified by the Federal Aviation Administration (FAA) as a Tower with Radar, the tower controllers are authorized to provide radar separation between:

Arrivals and Departures Successive Departures Departures and Overflights

All other aspects of radar separation are provided by controllers at Sacramento Terminal Radar Approach Control (TRACON) located at McClellan AFB approximately 10 miles east of Sacramento International.

Local Control: The Local Controller (Tower) is responsible for airborne aircraft within the tower's airspace and for aircraft on the airport's runways. It is the Local Controller's responsibility to ensure that the appropriate separation of arriving and departing aircraft exists.

Ground Control: The Ground Controller is responsible for aircraft operating on the airport's surface or movement areas. It is the Ground Controller that issues taxi instructions to arriving and departing aircraft. In addition, here at SMF, because of limited terminal apron space, the Ground Controller also provides advisory and traffic information to aircraft on the airport's two terminal aprons.

Clearance Delivery: The Clearance Delivery Controller is responsible for issuing IFR departure clearances and Class C VFR departure information to departing aircraft. This is done by radio or by computer data link. The Clearance Delivery controller does not provide control instructions. At SMF, the Clearance Delivery function is combined with the Ground Control position. The ATIS will specify whether to use the Clearance Delivery or Ground Control frequency.

As of October 2000, Sacramento International Airport was staffed with one Air Traffic Control Manager, one Operations Supervisor, and fourteen full-performance level controllers.

The Tower is presently an ATC-6 facility; formerly they were designated as a Level 2 VFR Tower. They are responsible only for successive departure separation, arrival/departure separation, overflight/departure separation and separation of VFR traffic within their traffic pattern. Sacramento Approach Control (TRACON) is responsible for arrival/arrival or approach separation.

It creates an interesting operation in that International is only one of two so-called VFR Towers in the entire US that are at the primary airport within Class C airspace.

Other Interesting Information about Sacramento International Airport:

Scheduled Passenger Airlines as of 3/10/2000 – Alaska Airlines, American Airlines, America West Airlines, Continental Airlines, Delta Air Lines, Horizon Airlines, Northwest Air-

lines, SkyWest Airlines (United Express), Southwest Airlines, Trans World Airlines.

Cargo Airlines: DHL Airlines, Federal Express Airlines, Pac Valley Airlines (FEDEX Feeder) and Skyways Airlines (DHL Feeder).

Terminal A: There are twelve gate locations. America West occupies Gates 2 and 4; Delta occupies Gates 1 and 3; Continental operates from either the America West or Delta Gates and Southwest occupies Gates 10 through 17.

Terminal B1 presently has eight gate positions. These are occupied by American (Gate 33), Trans World (Gate 32) and United/United Express (Gates 31, 34, 35, 36, 37 and 38).

Terminal B2 presently has eight gate positions, however only four jetways. These are occupied by Alaska (Gate 23), Northwest (Gate 22), and Horizon (Gate 27). The jetway at Gate 21 is used for overflow. Gate positions 24, 25, 26, and 28 are not used

Commuter Terminal has three ramp positions; these are presently unoccupied.

Off Terminal Parking Positions: There are several off terminal parking locations on the North Ramp, they are used for overnight parking, charter flights, or delay holding. There are two off terminal parking locations on the South Ramp. Spot 1 is leased to FEDEX for its cargo operations, the remaining spot is used for overnight parking.

General Aviation Facilities: The General Aviation Ramp is located southeast of the approach end of Runway 34L. It is accessed by taxiways G1 and G2. The General Aviation Ramp and taxiways G1 and G2 are restricted to aircraft with maximum gross weights of less than 60,000 pounds. Taxiway G1 is generally used in a southerly directions (inbound) and Taxiway G2 is generally used in a northerly direction (outbound).

Other General Aviation Facilities: There are two corporate hangars located off Taxiway P. In addition, there is a Cessna Citation Service Center and an FAA Flight Inspection Area Office also located off Taxiway P.

Department of Airports UNICOM: The Sacramento County Department of Airports operates and manages the General Aviation Ramp Facility. They operate UNICOM service on 122.950 MHz. They will, depending on workload, provide transportation from the General Aviation Ramp to the Terminals or to the Rental Car Facility.

Thanks again, Bill.

That's it for this month, folks. See you all in June with more aero news, views, and frequencies for all! Until then, 73 and out.

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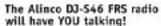
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Stakeout!

hen I DX, I usually just spin the dial until I hear something interesting. I stick with the frequency only until I either hear an ID or decide the station isn't going to identify anytime soon. But a few weeks ago, I tried something different.

Several DXers had reported on the Internet hearing a signal under WLAC-1510 with gospel music. I live only 20 miles from the WLAC towers, but have heard other stations under WLAC myself. I decided to stake out 1510 kHz and see what surfaced.

I did not hear the gospel station reported by others. But there were other signals in there. One station was carrying Christian contemporary music; another nostalgia music from the 1940s and 1950s; a third with talk. All of them were fading over and under each other – and audible only during the pauses in WLAC's programming.

Luckily, WLAC was carrying a sports call-in show with plenty of long pauses. From one station, I heard bits and pieces of weather forecasts – a public-service announcement for the Black Canyon Wildlife Management Area - and the slogan "The Voice." A few minutes later, the nostalgia-music station faded up just long enough to sneak in "AM 1510 KMND." I checked the calls and format with the NRC Log: they match. This 2,400 watt station from Midland, Texas, is now in my log.

I considered calling it a night. But my curiosity took control, and I stayed at the dials. Along came another "The Voice" slogan - this time followed by call letters. It sounded like WDCY. I looked them up - they're on 1520. Guess I got it wrong. Here comes the weather again – and a sponsorship announcement - "American National Bank forecast" and the calls again. This time, they sounded like they might be KVCY. That's a FM station in South Dakota, but maybe the bank ad will help track this one down.

I brought up my Internet connection and typed "American National Bank" into a search engine. The first hit is for a bank in Wichita Falls, Texas. There are no 1510 stations anywhere near Wichita Falls, but the bank's page suggests it has other locations. The next hit shows several locations in northeast Texas. Hmmm, I wonder if it might be "KVCI"? I typed those call letters in to the search engine, and the first hit is KVCI's own website. It shows the slogan "The Voice" and a list of records played, including the ones I heard. Going back to the American National Bank site, I found a branch in nearby Terrell, Texas. Mystery solved: a second new station, this one from Canton, Texas, went into my log.



Back in the 1920s when AM DXing first became a popular hobby, people used radios like this 1926 RCA.

I've since staked out 680 and 1070 kHz in (successful) hopes of relogging California; and 1060 kHz in (vain) hope of figuring out who besides KYW is carrying CNN Radio News. Give it a try; you never know what you might catch!

Mailbag

Charlie Manning in western New York State and Keith Stein near Washington, DC, have both heard the new CHWO-740 Toronto. See last month's column for more information on this station. The Ontario DX Association is handling QSLing for this station; if you log enough details for a report, it can be sent via P.O. Box 161, Station A,

- Willowdale, Ontario M2N 5S8, Canada Jim, WO3Z near Pittsburgh wrote: "I have a TS-940 and 80 meter dipole. Is there any chance of hearing something Trans-Atlantic with that arrangement, or is a Beverage a must for TA?"
- From that far west, it will be tough but possible. I should first warn that I don't have much experience with European DX; it's tough from anywhere west of the Appalachians. But I have heard European signals on my 160-meter dipole, using the same receiver Jim has. Keep an ear on the longwave broadcast band between 150 and 300 kHz; if there are good signals on this band, it's time to check out 530-1700 kHz.
- After 44 years of playing the hits first, as Canada's first Top 40 station, and then playing them again as Toronto's oldies outlet - CHUM-1050's days as a music station are over. The station has switched to an all-sports format. Several co-owned stations in other Canadian cities are following suit.
- There is only one new expanded-band station to report this month. KAVT-1680 Fresno, California, has appeared on the air. They're carrying Radio Disney.

Spring storms are coming, but there's still plenty of DX to be had. What are you hearing? Write me at Box 98, Brasstown NC 28902-0098. bv email or w9wi@w9wi.com. Good DX!

Eddi Gorham of Chattanooga has been busy on the dials. Some of her more exotic loggings:

WIOD-610	Miami, FL
KMTL-760	Sherwood, AR
WTCW-920	Whitesburg, KY
KCTA-1030	Corpus Christi, TX
WBAL-1090	Baltimore
KCHR-1350	Charleston, MO
WIGG-1420	Wiggins, MS
WAIK-1590	Galesburg, IL

WBAL is a particularly good catch as it's very directional in the wrong direction, protecting KAAY in Little Rock.

georgez@nacs.net

Tenth Anniversary of Zeller's Outer Limits

his month marks my tenth anniversary as *Outer Limits* columnist in *MT*. We have now seen a full decade of pirate broadcasts, clandestine transmissions, and other odd stuff on the shortwave bands. I've had a lot of fun searching through the unusual, the bizarre, and the weird material that's constantly generated by unlicensed broadcasting all over the world.

Of course, this column has been around for much longer than ten years. But, I want to thank literally hundreds of *MT* readers who have helped me along the way. Without your great support, we would not be able to profile the unlicensed broadcasting scene every month. My thanks go out to every one of you; it's been a great ride!

What We Are Hearing

MT readers heard nearly two dozen pirate stations again this month, all between 6940 and 6955 kHz. Your best bet is to tune these frequencies on weekends, two to four hours before or after local sunset. Europirates usually operate on 49 meters using frequencies noted below, also normally on weekends. Most Europirates use AM modulation, while about 75% of North American shortwave pirate broadcasters use sideband modes, usually upper sideband.

Alpha Lima International- One of the best heard Europirates in North America, this one snuck through both on 62190 at 0600 UTC and on 21890 at 1700 UTC. (Hoogeveen)

Blind Faith Radio- Dr. Napalm and classic rock music remain closely associated on the pirate bands. (Uses blindfaithradio@yahoo.com e-mail)

Crunch Radio- This is a brand new operation with big band music, old radio ads, and a slogan of, "Crunch Radio, Full Range Fidelity." Their random talk is offbeat in the pirate radio tradition. (None yet)

East Coast Beer Drinker- This guy has returned after an extended absence from the pirate bands. You never have any doubts about his favorite beverage. (Blue Ridge Summit)

Friday Radio- Another veteran pirate, this one broadcasts only on Fridays to celebrate the weekend. (Providence)

KIPM- Alan Maxwell's elaborate but weird dramas have been heard all across North America, and even overseas. His content is depressing but his signal is a whopper! (Elkhorn)

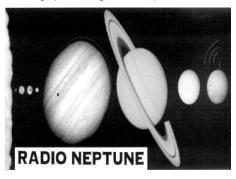
Melvin Malfunction Radio - Melvin, with a voice sounding like a computer, plays oldies rock on this new one. (Uses melvinmalfunction@yahoo.com e-mail.

Laser Hot Hits- Another good Europirate target is this one on 6220 kHz, with best reception around European sunrise. (Merlin)

Pirate Radio Central- This newcomer has featured hard rock music with offbeat commentary, but we don't know much about them yet. (None)

Radio Free Speech- Bill O. Rights is back with programs supporting freedom, but he also has been relaying several classic pirate stations. (Belfast)

Radio Neptune- Joe Mack's "Universal Service" has now produced seven different shows, and as we see here, QSLs are arriving. (Blue Ridge Summit)



Radio Three- Sal Amoniac is a parody of licensed broadcasters, other pirates, and himself, all at the same time. (None, QSLs logs in *The ACE*)

Radio Toronto- Their announcer, Brody, interviews local Toronto personalities and generally discusses Toronto issues. (Merlin)

Scream of the Mosquito- Their name is a parody of "Scream of the Butterfly," a former pirate now gone legit. Rock music and ID's make up the programming fare. (None, verifies logs in The ACE)

Sycko Radio- Pronounced "Psycho," this one is a frequent broadcaster but is a nonexistent QSLer. (None)

Take It Easy Radio- The soft rock content on this one takes its name from the Eagles' rock tune, and the playlist often includes the Eagles. (Belfast)

Voice of Captain Ron SW- Captain Ron has returned with live broadcasts in 2001. (Uses captainronswr@yahoo.com e-mail)

Voice of the Angry Bastard- When not venting his anger, this fellow relays other pirate stations. (None)

WHYP- James Brownyard parodies other pirates, parodies the original WHYP weather

in North East, PA, and generally sets a high standard for pirate radio. (Uses whyp1530@yahoo.com e-mail)

WMFQ- Their IDs are unmistakable, always with a sarcastic and profane plea to send QSLs. They do send them! (Providence)

WMNM- Also giving identifications as "Slim Shady Radio," this new one is dominated by Eminem music and techno rock. (Uses slimshadyradio@yahoo.com e-mail)

Reports and QSLs

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. This finances postage for a souvenir QSL to your mailbox. Send your letters to these addresses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 69, Elkhorn, NE; 68022; PO Box 293, Merlin, Ontario NOP 1W0; and PO Box 663 7900ar Hoogeveen, Netherlands. A few pirates, as listed, prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. Reports to the Free Radio Network go to http:// www.frn.net/ on the web. Free Radio Weekly loggings go via *niel@ican.net* e-mail. Sample copies of *TheACE* are \$2 via the Belfast maildrop.

Thanks

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via my e-mail address atop the column. This month we heard from another great turnout of unlicensed broadcasting enthusiasts including John T. Arthur, Belfast, NY; Ranier Brandt, Hoefer, Germany; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; The Dude, Wellsville, NY; Sheldon Dunhan, Rochdale, CT; Joe Filipkowski, Providence, RI; Steve Foehner, Rochester, NY; Harold Frodge, Midland, MI; Captain Ganja, Belfast, NY; Jorge Garcia, Santiago, Chile; William T. Hassig, Mt. Prospect, IL; Darrell Hewitt, Salt Lake City, UT; Jim Keeling, St. Charles, MO; Dave Kirby, Wickliffe, OH; Chris Lobdell, Stoneham, MA; Dr. Love, Belfast, NY; Greg Majewski, Oakdale, CT; Alan P. Masyga, Winona, MN; Bill McClintock, Minneapolis, MN; Cachito Marnani, Santiago, Chile; Craig M. Pradarelli; Mike Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Martin Schoech, Merseburg, Germany; Lee Silvi, Mentor, OH; Bud Stacey, Setsuma, AL; Dan Weston, Standish, ME; DJ Stevie, Basel, Switzerland; Dan Weston, Standish, ME; Lee Witham, San Diego, CA; Niel Wolfish, Toronto, Ontario; and Dave Zacek, Lafayette, IN.



Pipeline Reception, Reader Mail

ometimes it seems like a radio "pipeline" exists into certain parts of North America. Here in Western NY for example, I hear many beacons from the state of Iowa. At first, I thought perhaps these stations ran more power than the typical U.S. maximum of 50 watts, or that they enjoyed relatively "clear channel" status. Upon checking official records, however, I found that the majority ran only 25 watts, and shared frequencies with beacons from many other states.

Interestingly, I rarely hear New England beacons, except for TUK/194 and a few other big guns. The New England states are much closer than Iowa, so why such a marked difference in reception?

I don't have a definitive answer, but I recently discovered that I am not alone in my observations. Jacques d'Avignon (Ottawa, ON) sent a list of Iowa stations he has heard consistently over the past year or so, mostly between the morning hours of 10:00 and 12:00 UTC. (See Table 1.) He too, is curious about why these rather distant stations come in with such regularity at his location.

Table 1. Iowa Loggings from Ottawa

FREQ.	ID	LOCATION
293	CJJ	Cresco, IA
368	SOY	Sioux Center, IA
407	BNW	Boone, IA
410	EGQ	Emmetsburg, IA
411	SDA	Shenandoah, IA
417	IY	Charles City, IA
423	CKP	Cherokee, IA
428	POH	Pocahontas, IA
512	ORC	Orange City, IA
515	RRQ	Rock Rapids, IA
518	GCT	Guthrie Center, IA
524	UOC	Iowa City, IA

Can anyone offer clues to this mystery, or report on similar situations in other regions? Is it terrain? Most of the Iowa beacons are in lofty locations – well over 1000 feet. My receiving location is just below this level at about 950 feet. Could it be that the Iowa signals have a "clear shot" to me while the New England signals are blocked by the rather mountainous, rocky terrain that begins about 200 miles to the east of me?

If the mountains are indeed acting as a "wall" to longwave signals, they might also serve to *concentrate* signals arriving from a westerly direction – similar to the effect of a reflector element on a beam antenna. This is strictly speculation, so I welcome ideas from anyone else.

Mail Call

- Welcome to first-time contributor Rodney Johnson (FL) who wrote in with a fine list of loggings made with his Drake R8B receiver and an active antenna. He notes that he logged 99 stations in just four nights of monitoring. Nice work, Rodney; we look forward to hearing from you often. A sampling of Rodney's logs are included in Table 2.
- Gregory Morrow (ME) wrote in with a question relating to beacon locations. For the past few years, he's been traveling across the Eastern U.S. and Canada mapping and listing "different things" with his GPS unit. Part of his list includes beacon sites he has found by trial and error. He wants information on how to locate these sites with more precision than just town names. Well, Gregory, the answer may be as close as your GPS unit. Fortunately, the exact latitude and longitude of most beacons is known and is available in various beacon guides.

The North American BeaconFinder, for example, (see ad in this issue) contains the coordinates for virtually all U.S. beacons and a majority of Canadian ones. You should be able to use your GPS unit to direct you to the published coordinates with little or no trouble. Alternatively, you could take a portable LW receiver with you and track these stations down. This can be time consuming, but it is also fun and rewarding when you find the target.

• I am pleased to hear from Jim Labor (FL) who inquired about beacon EVB/417 kHz near New Smyrna Beach, FL. He'd like to know the exact location of the site and type of equipment it uses.

EVB is located 3 miles northwest of New Smyrna Beach and serves the New Smyrna Beach Municipal Airport. Its coordinates are 29.03.15N, and 80.56.27W. It is just 12 feet above sea level and runs 25 watts to a tophat vertical antenna. For complete information about

BEACON
This will verify your
Date: March 5, 1996
Freq: 120 KHZ
Time: ayla uta
Elevation: 1916 FeePower: 25 Warts
Location: 40 37 W 96 56 W
Antenna Type:

No P
Remarks
No brasks

CEK/420 kHz, Crete, NE (Courtesy of Allen Renner, PA)

the airport that EVB serves, visit http://www.airnav.com/airport/EVB.

Web Resource

Ever wonder how far away that beacon is that you're hearing, or what the compass heading would be for best reception on a directional antenna? Check out http://www.indo.com/distance/ for a quick answer online. All you need to enter your location and the location of the beacon. It gives you the mileage between these two points, plus directional headings. You can also choose to see a map with both locations identified. This site is a very useful resource for serious DXers.

See you next month!

Table 2. Selected Beacon Loggings

FREQ	ID	LOCATION	ВУ
198	DIW	Dixon, NC	R.J. (FL)
200	HXF	Hartford, WI	J.R. (NY)
203	PVB	Plattesville, WI	A.R. (MI)
207	YNE	Norway House, MB	A.R. (MI)
216	CLB	Wilmington, NC	R.J. (FL)
216	LRG	Lincoln, ME	J.R. (NY)
221	RQM	Rangely, ME	J.R. (NY)
230	SH	Shreveport, LA	A.R. (MI)
230	VYS	Peru, IL	A.R. (MI)
230	QB	Quebec City, QC	A.R. (MI)
239	SAR	Sparta, IL	A.R. (MI)
248	WG	Winnipeg, MB	A.R. (MI)
257	SQT	Melbourne, FL	J.R. (NY)
266	BR	Atlanta, GA	J.R. (NY)
268	UBY	Bayamo, Cuba	J.R. (NY)
276	TWT	Sturgis, KY	A.R. (MÍ)
278	EOE	New Berry, MO	R.J. (FL)
284	PTB	Petersburg, VA	J.R. (NÝ)
290	EKQ	Monticello, KY	A.R. (MÍ)
317	CBE	Cumberland, MD	A.R. (MI)
326	PKZ	Pensacola, FL	A.R. (MI)
330	CZM	Cozumel, Mexico	J.R. (NY)
332	FIS	Key West, FL	J.R. (NY)
335	LUK	Cincinnati, OH	A.R. (MI)
344	ZIY	Georgetown, Cayman Is.	R.J. (FL)
350	LE	Raleigh, NC	A.R. (MI)
350	IUI	Blytheville, AR	A.R. (MI)
354	LI	Little Rock, AR	R.J. (FL)
368	RRJ	French Lick, IN	J.R. (NÝ)
391	DDP	San Juan, PR	A.R. (MI)
403	BPO	Oneida, TN	A.R. (MI)
412	UNG	Nueva Gerona, Cuba	R.J. (FL)
413	TAM	Tampico, Mexico	R.J. (FL)
420	CEK	Crete, NE	A.R. (MI)
513	RRQ	Rock Rapids, IA	J.R. (NY)
515	PN	Ponca City, OK	R.J. (FL)
520	IQS	Sallisaw, OK	J.R. (NÝ)
526	ZLS	Stella Maris, BAH	R.J. (FL)

Logging contributors: Jim Renfrew (NY), Andy Robins (MI), Rodney Johnson (FL)

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den scanners

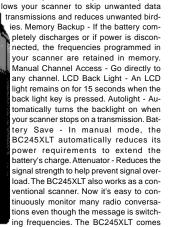
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N THE HAM BANDS THE FUNDAMENTALS OF AMATEUR RADIO

Muscle Cars and Antenna Wire

was working in my basement shop one evening. An amateur radio operator that recently upgraded to General Class stopped by for a visit. My work area has always represented a gathering spot for hams and folks who are looking to become hams. We were chatting while I was melting solder on some project or other.

The conversation turned to contesting and I asked this new General if he was planning on digging in and using the contests to fill his log with some neat stuff. After all, that's what the HF privileges that come with the General Class are usually about.

Well, this ham told me that he had purchased a nice used low band rig a few months back but hadn't gotten around to putting up an antenna. If found this kind of curious so I quizzed further as to the reason why. Initially I thought the guy was up against problems with neighborhood esthetics or a spouse that didn't have an appreciation for the natural beauty of a well-constructed antenna. Nope, none of these problems existed. This ham had free reign to put up any antenna he chose. So what was the problem?

I was further surprised when the ham picked up a copy of a popular ham magazine sitting on one of my bookshelves. On its cover was what looked like a very fine 120-foot tower sporting rotatable 20-meter monoband Yagis, one at 60 feet and the other at the top. Probably a picture of a major contest station's "Hot Setup."

My friend pointed to the picture and said, "I can't afford something like that. What's the point of getting on the air?" Well this was interesting. This was a clear case of antenna envy. I said that, while I could admire this remarkable antenna and perhaps even lust after it on some level, I noted that neither I nor most other hams had antennas of this caliber. I went on to say that I've been operating since the Seventies and I never used a tower or directional antennas. My modest means and various living situations have always kept me working with wire antennas.

In a recent survey of antennas used by members of one particular QRP radio society (folks who try to optimize antennas in lieu of high output power), dipoles and wires outnumbered beams by over seventy-five percent. How had this friend of mine become paralyzed to all the fun ham radio has to offer? The ham had become caught up in what I call the Hot Car Magazine Syndrome. Allow me to explain.

If you go to any magazine rack in any convenience store in the land, you will see dozens of magazines devoted to high performance cars. You will find these magazines present page after page of the most perfect examples of the state of the automotive art. You will see vehicles that often sport tens of thousands of dollars in aftermarket modifications. Further, the owner will have spent countless hours to bring the car to the point of perfection. I remember reading of one man whose car won a major national award saying that he did nothing else but work on this car for over three years!

Do you see the point? How many of us have the freedom and resources to drop every other responsibility and just play amateur radio? But here, my poor friend had become convinced that he needed this multi-thousand dollar antenna system just to get on the air and work a few contacts. As with the car magazines, most of us can admire a well designed hot rod but we drive around in our Fords and Mazdas. I can ooh and ah over the pictures of super contest stations in the pages of ham journals while still having tons of fun with my much more modest station set-up.

Turning to the advertising section of this ham magazine my friend was looking at, I pointed out that a "world class" transceiver goes for around four grand, a sturdy 2 kilowatt amplifier would add another couple of thousand dollars or so plus about \$500 to upgrade the house wiring to handle the power. A "tall enough" tower and installation would run another \$1500 and then you could mount a good \$450 or so beam at the top. We are not talking chump change when it comes to building a station to run with the big dogs!

I brought my friend up out of my workshop and into my shack. I showed him the various awards on my walls. I showed him the books full of QSL cards. I showed him the stack of cards waiting to get sent out through the bureau from the previous weekend's contest. Then I pointed to my station.



Uncle Skip's workshop is a gathering place for hams and soon to be hams

I told him I never spent more than \$400 on a transceiver until my recent building of the Elecraft K2. The cost of that rig was still well under a thousand dollars and I only purchased it because of my strong desire to build my own rig. Add to that about fifty dollars in accessories and a couple of antennas strung out of wire bought at my local hardware store. Over the twenty-five years I have been a ham I don't think all the money I have spent on radios and equipment ever came close to the cost of a single modern "top of the line" transceiver.

Still, I can't remember a day in all of those years that I didn't think ham radio was the most fun I ever had with my clothes on! In other words, I was getting by just fine driving my economy car with well over a hundred thousand miles on it. Yeah, a Ford Mustang with a 500 cubic inch "crate" motor running plumbed-in Nitrous Oxide through a reworked transmission to a nine-inch custom rear and the biggest Mickey Thompson street slicks I could tub into the back end of the car would be nice if I ever hit the lottery, but I wasn't going to stop driving just because I couldn't afford one!

So this entire exercise served to help get my friend's mind right about the reasonable costs of amateur radio fun. With that, we returned to my basement to strategize a bit about his particular antenna predicament. There was no reason in the world why I couldn't have this guy on the air before the upcoming weekend

I looked around the workshop and found a spool of about 100 ft. of 14 gauge hookup wire. I then rooted around some more and found a well-used but functioning MFJ-901B "Versa Tuner." (I think I have about four of these things now and I suspect they breed in the damper corners of my basement.) I handed the wire and tuner to my friend and said "Go for it!" He looked at me as if I had three heads. "How am I going to work anything with that?" he said.

The End-Fed Random Wire

Now for the place in this article where Old Uncle Skip tries to "learn ya'll sumthin'." The End-Fed Random Wire antenna has probably been responsible for more amateur radio contacts than all of the other antenna designs combined! Of course it ain't perfect (I have the RF burns to prove it), but it will put a signal out on the air. You probably wouldn't want to go head to head with that double-stacked beam arrangement we talked about earlier, but you'll never want for contacts either.

If you're partial to older, tube type gear and know the fine points of adjusting same, you can often load a random length of wire directly off of the rig's internal pi-network. This is not for the weak-hearted and is definitely not recommended for modern solid state gear. It is very easy to generate stray RF when using a random wire antenna. At the very least you will need to tame the wire with an "L-Network," the most basic of antenna tuning circuits. You can find the design for this in any *ARRL Handbook* or *ARRL Antenna Book* as well as on a dozen or so websites.

Now if you want to get a bit more fancy, cut the wire to either 135 feet or 67 feet, and you can use it with most modern antenna tuners without much trouble, including newer transceivers that have built-in automatic antenna tuners.

I recently built an automatic antenna tuner circuit. I use this when I head out in the field camping. I toss a 67 foot wire up into the trees and let the tuner do the rest.

I sent my friend home with instructions to find a tree and I'd meet him Saturday night on 40 meters. He's been on the air ever since. He has returned the MFJ box and graduated to a pair of dipoles, one cut for 40 meters (that he also loads up on 15) and one tuned for 20. He's having too much fun to think any more about that big gun tower setup he saw in the magazine. And isn't that what ham radio is really about? Have Fun!

Uncle Skip's Software of the Month:

HAMCALC version 48 By George Murphy VE3ERP \$7.00 U.S. funds directly to George at: 77 McKenzie St. Orilla, ON L3V 6A6 Canada

e-mail: ve3erp@encode.com

I can't remember exactly when I first ran across HAMCALC, but to someone like myself who spent more time trying to figure out how to ask the girl next to me out on a date than paying attention in math class, this disk is an essential tool. HAMCALC is a collection of most of the math formulae needed to enjoy all but the most advanced aspects of amateur radio.

Now in its 48th version, the CD-ROM includes over 250 math and design programs. It's refreshing to see somebody still writing software in GWBASIC! As such, this disk of programs can probably be adapted to almost any computer you have in the house. I keep an older PC down near my workbench largely to run programs just like HAMCALC when I'm working on radios.

And the price is right! As "Murph" puts it himself, the program is free; the \$7.00 is simply to cover the cost of materials and airmail shipping anywhere in the world. Unless you can do quadratic equations in your head, you can probably benefit from having HAMCALC around the shack.

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We Realign the Philco *Transitone*

ack in January, we completed work on the Philco Transitone Model TH-14, a really cute little Bakelite table model. It worked as soon as it was plugged in, and normally my next (and last) step prior to reinstalling the radio in its cabinet would have been to tweak the set's alignment adjustments. But since, right now, I'm in a phase of writing for readers who are new to the antique radio restoration hobby, I put the set temporarily aside in order to discuss that all-important alignment tool: the r.f. generator.

Waiting on my "to do" shelf was a Triplett 2432 r.f. generator that I had purchased earlier for discussion on these pages. We used the last two issues of the column to go through the Triplett as an example of the type of instrument you might want to purchase for your own test bench. Now that it's up and running, we can use it to do any necessary realignment on the Transitone so that we can finally put the radio back together again.

Realigning a radio receiver may sound like a formidable task, but the steps are simple and logical, very accessible to the beginner, and go very quickly if the right preparations are made. The Philco is quite a simple set and so is going to make an ideal first alignment project.

Essential Alignment Tools

Besides a signal generator with audio modulation capability (see discussion in the two previous columns), we will need some kind of meter to indicate the strength of the receiver's audio output. There are several types of meters and hookups you can use, and a common strategy is to connect a VTVM (vacuum tube voltmeter), set for a.c. volts, across the radio speaker voice coil.

Now a VTVM is indeed a very handy instrument to have on your test bench. There's usually a good choice available for sale at radio meets, and they are not expensive or difficult to rehab and calibrate. I'm sure we will do a VTVM restoration project one day in this column. Yet only the most advanced radio service projects really require the use of such a sensitive instrument. And radio alignment doesn't need to be one of them.

For this project, I'm going to assume you have a meter no more exotic than the Radio Shack 20,000 ohms-per-volt VOM recommended in an earlier column. If you connect such a meter across a speaker voice coil, it might not be sensitive enough to give a reliable reading except with a very strong signal from the r.f. generator. Later, we'll see why that signal needs to be kept as weak as pos-

To get a decent indication from a conventional a.c. voltmeter, connect it from the plate of the last audio tube (in this case the 35A5) to ground, through a 0.1 mfd 600-volt capacitor (to block the d.c. also present in this circuit). In the Philco (see schematic published in an earlier issue), the metal chassis of the set is not used as d.c. ground. Instead, separate "ground bus" wiring is used to avoid connecting the chassis to one side of the a.c. line,

> which is the usual safety hazard built into a.c.-d.c. sets. Instead of chassis ground, I connected directly to the negative side of one of the filter caps in the power supply.

> For the alignment of the Philco, I deliberately used an even less sensitive volt-ohmmeter than the Radio Shack model - a vintage multitester having a sensitivity of only 1000 ohms

per volt. This, simply put, would make it 20 times less sensitive than the Radio Shack instrument. It was entirely satisfactory when connected as described.

With the output indicator taken care of, I had to decide how to get a signal from the r.f. generator into the Philco. Since the radio was equipped with a loop antenna, I opted for the "inductive" method, which would avoid the necessity of making any direct connection to the set. All it took was a few feet of solid insulated hook-up wire bent into a several-turn loop about the same size as the set's own loop. This was taped to the back of the set's loop and its free ends connected to the output of the r.f. generator.



White alignment tool points to oscillator trimmer adjustment screw; r.f. adjustment screw is above it. Light colored can behind speaker holds first i.f. transformer; the larger holes in top give access to adjustment screws.

It's good practice to allow the radio and the generator to warm up and stabilize for about 15 minutes before making any adjustments. After that I was ready to begin the tweaking of the radio's i.f. (intermediate frequency) channel. To do this, one must set the r.f. generator to the frequency of the channel, which - in almost any radio built, say, after the mid 1930s - is 455 kHz. If you have a schematic for your radio, you'll almost always find the i.f. frequency listed somewhere on it. There are ways of determining an unknown i.f. frequency, but that's something to be discussed in a later column.

Try to get the service data for your set before attempting an alignment. Often there will be complete information about the loca-



The Philco as set up for alignment. R.F. generator at left, multimeter at right. Wire loop in front of generator was taped to Philco's built-in loop to feed signal into set (see text).

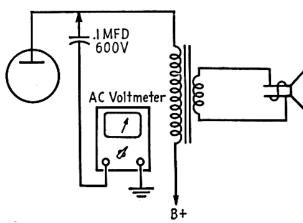
tion of all adjustment points, and a specific sequence of adjustment operations will be given. In the case of the Philco, the Rider's manual listing included little but the schematic and the i.f. frequency. However, generic procedures are more than adequate for this simple radio

Finally, you'll need a non-metallic alignment tool as described in an earlier column where I discussed the outfitting of your workbench. Use of a metal screwdriver for alignment (1) is dangerous, because the i.f. transformer alignment screws often carry B-plus voltages and (2) impractical because the presence of the metal will affect the tuning of the circuit you are trying to adjust.

Aligning the I.F. Channel

Setting my multitester's a.c. volts range for 150 (to make sure that the meter wouldn't be pinned by a loud noise), I turned the Philco's volume control full on, switched on the r.f. generator's internal modulation, and set the instrument's r.f. output for a medium level. I was rewarded by hearing the modulated tone coming from the Philco's speaker and seeing a good deflection of the meter.

My next move was to reduce the output of the generator to the minimum amount that could be heard in the speaker and reliably deflect the meter. The reason that the signal must be kept small is to avoid engaging the set's automatic volume control circuitry. If that were to happen, any increase in gain obtained by adjusting the i.f. channel would be counteracted by the action of the avc – and therefore not be observable. In the end, I was able to change the meter setting to the 7.5-volt range – getting usable readings of just a few volts.



How to hook up a conventional VOM (set to an a.c. volts range) to serve as an alignment indicator. See text for details.

Now I was ready for the i.f. adjustments. Generally there are two i.f. transformers, each in a can with a pair of screwdriver-adjusted trimmer capacitors on top. The idea is to begin with the second i.f. transformer. This is the one situated closer to the set's detector/

first amplifier tube – in this case a 7C6. Readers who followed the earlier discussions of this Philco will remember that its second i.f. transformer is physically unusual, located in a small metal can under the radio chassis instead of the conventional tall can mounted "above decks." It has only one adjustment trimmer, accessible from the top of the chassis near the tuning capacitor.

Most i.f. transformer adjustments have drifted seriously over the years, and it's very gratifying to see the significant increase in signal strength on the meter – multiplying itself manyfold as each succeeding adjustment is tweaked. I saw the expected major increase after adjusting the second-i.f. trimmer, and immediately had to reduce signal generator output to keep the meter at the desired minimum reading.

Subsequent adjustment of the first-i.f. trimmers resulted in an even greater increase in gain and prompted a further large reduction in signal generator output. After the first round of adjustments, one should repeat the procedure one or two more times to make sure the i.f. channel is delivering maximum gain.

Oscillator and R.F. Adjustments

With the i.f. adjustments completed, the next move was to adjust the radio's oscillator circuit. This step properly sets the dial calibration. On simple radios like the Philco, the tuning capacitor will be a 2-section unit. If one of the sections has cut (slitted) plates (as in the Philco), it is the oscillator section. Mounted on top of that section will be a trimmer capacitor that controls calibration at the high end of the dial.

Before making this adjustment, turn the

tuning capacitor so that the plates are fully engaged, then check to see if the dial pointer is at the lowest calibration mark on the scale. If not, move the pointer manually until it is.

Tuning the radio to a quiet spot between 1500 and 1700 kHz, I now set the signal generator to the frequency indicated on the radio dial. I was gratified to find that the signal came in at exactly that dial reading. If it hadn't, the adjustment trimmer would have brought it in. Be careful, though, the oscillator trimmer setting is very touchy and a tiny movement of the screw has a very large

effect! More complex sets may have a "padder" capacitor that is used to set the calibration at the other end of the dial (typically 600 kHz). We'll be demonstrating that type of adjustment in some future restoration project.

If in doubt about which of the sections of a tuning capacitor controls the oscillator, tune in a station and touch the stator (stationary part) of each section with your finger. But be sure you are powering the set through an isolation transformer – especially if is an a.c.-d.c. model! Your finger will detune the radio when you have touched the oscillator stator. But it will have little effect when you touch the other (r.f.) stator.

The final adjustment for this radio is the r.f. trimmer, which is mounted near the oscillator trimmer but over the other section of the tuning capacitor. This is also done at the high end of the dial. I adjusted the trimmer for maximum reading on my output meter, using the same r.f. oscillator and radio dial settings employed in the previous step. Some radios also have antenna trimmers (often found mounted on the antenna loop). This trimmer is also to be adjusted for maximum output.

See you next time, when we'll start another restoration project. I haven't made up my mind what it will be yet, but I have a couple of good ideas!

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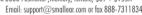
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Antennas Across the Spectrum: Part Two: The MF and HF Bands

The Importance of Wave Propagation on Antenna Design

Just as on the lower bands, ground-wave propagation is the dominant mode of propagation on the MF band. However, the further we move toward the high-frequency end of the MF band, the more common sky-wave propagation becomes. Sky-wave propagation is when signals emitted from an antenna on earth travel to a layer of the ionosphere and refract back to earth one or more times.

In sky-wave propagation there is relatively little signal attenuation, so at times long-distance communication with very low power is possible. An advantage to this is that, using moderate power levels, fairly reliable communication paths can be established by considering the relatively predictable nature of sky-wave propagation conditions. Antennas which launch their signals at low vertical angles above the horizon support long-distance sky-wave com-

munication. On the other hand, high vertical angles (NVIS) can sometimes be used when ground waves are blocked by obstacles such as mountains. NVIS antennas must radiate signals at high vertical angles allowing the signals reflect back down to earth relatively near the transmitting antenna.

At the high MF frequencies and low HF frequencies sky waves sometimes return to earth close enough to the transmitting antenna to interfere with the antenna's ground wave signals. This can produce signal fading where these waves combine, and has led to the development of antifading antennas. These antennas produce radiation patterns which significantly reduce sky waves, and thus reduce interference to the station's ground wave from its own sky waves (see fig. 1).

As we move up in frequency in the HF band, ground wave communication becomes relatively unimportant, although it is still effective for increasingly shorter distances.

Transmitting Antennas for the MF and HF Bands

The size of antenna elements is generally directly related to the wavelength for which the antenna is designed. And, the higher a signal's frequency the shorter its wavelength. Therefore many of the antennas we discuss this month could literally be dwarfed by those we discussed last month. Recall that at the VLF and LF wavelengths the length of some antennas' elements are measured in miles. This month we find element lengths shrinking to hundreds of feet on the MF band and even on down to tens of feet on the HF band.

Due to the smaller size of elements on these bands many antennas can be designed for the MF, and particularly the HF band, with greater gain than is possible on the lower bands. Good directivity is also relatively easy to achieve at the upper end of the MF band, and more so on the HF band.

As on the lower bands, ground-sited vertical antennas are very useful. The quarterwave vertical is perhaps the most

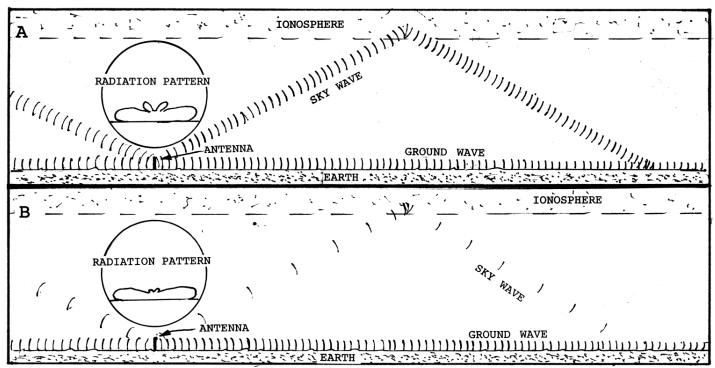


Fig. 1. A vertical antenna which produces sky waves that interfere with its ground waves thus causing fading.(A). An antifade antenna which produces an insignificant amount of sky waves, and thus reduces fading.

This Month's Interesting Antenna-Related Web site:

Looking for an antenna Elmer? (Elmer is ham-talk for "friendly teacher.") Try http:// members.home.net/ac3l/antenna.htm.

common; however, other electrical lengths such as the halfwave and 5\8 wave verticals are useful. The longer elements generally give increases in useful signalstrength gain, with the in-line (collinear) multiple-element verticals offering the greatest useful gain. They also give lowangle vertical, nondirectional radiation. The ground-sited verticals require a good ground-radial system for efficient performance. The groundplane antenna, which utilizes non-grounded radials, is popular in the upper frequencies of the HF band.

Dipole antennas are quite common on these bands. Whereas the various halfwave dipole designs are typical, we also find application for dipoles both shorter and longer than a halfwave. Typically sited horizontally, these antennas provide decent gain levels along with relatively nondirectional coverage (at typical heights their nulls are not too deep).

The various beam-antenna designs offer both gain and directivity. The simplest are the wire beams which include the longwire, the V, and the rhombic. Although these antennas are capable of good directivity and gain, they require a lot of space, particularly as they are mainly utilized at the low-frequency end of the HF band and

Phased array beams utilize multiple elements which are all driven (connected to the source of transmitter power). Typically they give fair directivity and gain levels. Most phased designs can be made switchable in direction; however, on MF and lower frequencies they can require a lot of space.

The various curtain beams are capable of fairly high gain levels and relatively narrow beam widths. They are quite large, and their primary application comes in longhaul HF broadcasting.

Parasitic beams (some elements are not connected to the source of transmitter power), such as the Yagi-Uda and cubical quad, offer good gain and directivity on the upper half of the HF band. At considerable expense they can be had across the lower half also. Above 10 MHz they can be built small enough to mount on a modest size tower and to rotate by remote control to any compass direction.

Many of the antennas discussed here can be made multi-band by any of several means. Nevertheless such antennas are relatively narrow banded compared to frequency-independent antennas such as the log periodic dipole array. An LPDA can provide good gain and directivity across a wide section of the spectrum.

Receiving Antennas for the MF and HF Bands

We usually want a transmitting antenna to be efficient, and radiate a maximum of power. However, as we discussed for VLF and LF antennas last month, receiving antennas on MF, and usually also on HF, needn't be very efficient. This is because the quality of reception on these bands is determined not by the level of received signal, but by the ratio of receivedsignal strength to the relatively-high level of received noise on these bands. Antenna efficiency then becomes more important in situations where received-noise levels are very low. Typically these situations are in very rural areas, in latitudes toward the poles, or in the higher frequencies of the HF band when noise conditions are favor-

Antennas tend to have the same gain, directional patterns, feedpoint impedance, and so forth whether utilized for transmitting or reception. Due to this "antenna reciprocity" we find that it is very common on the HF, and even on the MF band to utilize the same antenna for both transmission and reception. However, there are many exceptions to this practice.

As on the VLF and LF bands we find active antennas and small (desk-top) loops antennas useful and convenient in many reception applications. The Beverage (wave) antenna is very directional, and, although it can be used for transmitting it is quite inefficient. Its main employment is as a receiving antenna at the low end of the HF band and lower. It requires a lot of real estate to erect. Random-length wire antennas, usually the higher and longer the better, offer good performance for many HF and MF listeners with minimum expense.

There are many other antenna designs available besides the more common ones which we cover in this survey. We'll discuss many of them in upcoming columns.

Unusual Antenna Contest!

Do you know of an antenna that is quite different in appearance or function from the ordinary antennas we see everyday in the cities and countryside? One highly unusual or even

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weird? If you do, send me a photo or sketch of it, any information you have on the antenna, and your reasons for choosing this antenna for entry in our contest. We'll publish the entry I judge most appropriate in this column, and award an antenna book to the winner!

RADIO RIDDLES

Last Month:

I said "Enough of this play on the term 'radio,' OK? Now tell me who invented radio? Hint: This may be a trick question!"

The trick is that there is not one "who," but many. Among those variously credited with the honor are Tesla, Marconi, Poppov, Dolbear, and Loomis.

This Month:

Who first convincingly demonstrated to scientists the electromagnetic waves we now call "radio waves"?

You'll find an answer for this month's riddle, another interesting, antenna-related web site, and much more, in next month's issue of Monitoring Times. 'Til then Peace, DX, and 73.

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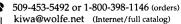
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I Command You To Scan!

ast time we looked at the Game Commander 2 voice command software (http://www.gamecommander.com) applied to the control of an ICOM R7000 via a program called RadioMax. We saw that voice command of a receiver, or for than matter any keyboard command-based program, can be fairly reliably controlled by an inexpensive software product. My past disappointing experiences with voice input were quickly, and firmly, reversed by Game Commander 2. Not to be left out of a technological breakthrough, Microsoft has introduced a product which is also capable of adding voice command to your computer. But does it work with our radios? Let's see.

SideWinder Game Voice is Microsoft's first foray into voice input. When I opened the box I was surprised by what I found, dare I say ithardware! Where the Game Command 2 is a software only product that utilizes the sound card in your computer, not so for the Game Voice.

At a minimum, to use Game Voice you will need a 233 MMX Pentium system, 64K of RAM, 45 MEG of hard drive space, a 4x CD ROM drive, full duplex sound card, 256 color SVGA display, Windows 98 and a USB port. Although by today's standards this is nothing special, it certainly blows away the idea of utilizing a cheap older computer. In addition, the computer must have Microsoft's DirectX version 8. This can easily be obtained free of charge from Microsoft's website, http://www.microsoft.com/sidewinder/ swupdate/.

In comparison, Game Commander 2's hardware requirements are less, and do not require a USB port, 65K of RAM, Windows 98, nor the connection of a control box and its associated wiring.

Software Installation

Make sure you install the software before you install the hardware. This is so the USB port device can be correctly detected. Version 1.0 Software for the Game Voice is quickly installed from the included CD ROM. After you install the software from the CD ROM, you should download the latest version (currently 1.2 beta) from the Microsoft website. Having tried both, I believe version 1.2 beta seems a bit quicker and has better recognition accuracy. Also, version 1.2 does not automatically start up

your internet connection, which is necessary for the internet chat function. For our voicecontrol-only applications we don't want, or need, to activate the modem. So, right now, version 1.2 is your best bet.

Hardware Installation

Microsoft, the king of software, designed Game Voice around a control box which uses the computer's USB port and the sound card. The flying-saucer-shaped control box is the heart of Game Voice. See Figure 1. The supplied Plantronics boom microphone/stereo headphones are connected to it via two plugs. A three plug cable, hardwired to Game Voice, is then connected to the USB port of your computer and the sound card's microphone and speaker jacks. Finally, your computer's speakers are reconnected into a junction box on the Game Voice cable. (A surprisingly hardware intensive installation from the king of software...)

The control box does provide the user a speaker/headphone volume control. Also a switch to choose between the two is provided. Having these controls at hand is very convenient for many non-Game Voice applications.

Installing the software automatically takes you through level settings for the microphone and speakers. Make sure you pay particular attention to the microphone level. I found this a bit tricky with the original software, which set the level much too high. This resulted in performance so poor I almost gave up on Game Voice. I realized the microphone level was set too high when my wife called me from another room and the screen responded "Not Recognized."

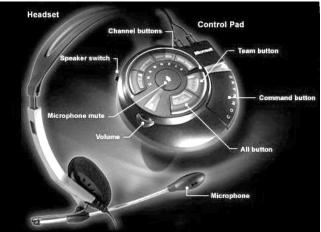


Figure 1 - Microsoft's Sidewinder Voice Control Hardware

His Master's (Game) Voice

Figure 2 displays the Game Voice main display screen. Game Voice, like Game Commander 2, actuates keyboard keystrokes when it recognizes a voice command. Therefore, the user must define which associated keystrokes are to be "pressed" when a word or phrase is recognized. This is done by clicking Profile Options, then New. Once you enter the name of your new command file, you can type in commands and their corresponding keystrokes. Figure 2 shows the eight commands I have set up for controlling RadioMax with Game Voice.

Be sure to set the command function to Multiple Commands by clicking Game Voice Settings and then the Command tab. Then the voice command mode will be continuously active once the button is pressed on the control box, instead of being in a push-to-talk mode.

Once programmed, using Game Voice is as easy as clicking its icon, selecting the appropriate user-generated command file (JFC-RadioMax) and then starting RadioMax. Say the command and the computer will respond just as if your fingers were punching the keyboard. It's that easy. And it works very well. This again proves that voice input is real and here to stay.

Game Voice vs Game Commander 2

The first difference is that Game Voice comes with quality stereo headphones with a boom microphone. The Game Commander 2 headset is a single earphone unit, and therefore mono only.

> Game Commander 2 provides two different sounds when you speak to it; one is to acknowledge recognition of your voice command and a different sound to tell you it did not understand. The program also allows the user to record "wav" files for each command. These are then "spoken," in place of the simple sounds, when recognition takes place. Although I did not try the way file feature, I found the audio acknowledgment feature of Game Commander 2 to operate erratically on two different computers.

Game Voice faired better with its audio acknowledge feature... well, almost. Game Voice provides synthesized voice (male or female) response which "reads" and repeats your command. No voice recording, or wav files required. Conceptually, the guys at Microsoft got this one right. But, for some reason, which I assume is related to memory space usage and/or the sound card, the voices usually start out sounding like they are playing at much too slow a speed. I found that when I loaded Microsoft Flight Simulator 2000 after Game Voice, the voice became normal.

Who's Got The Speed? Surprise!

For both the Game Voice and the Game Commander 2, speed of operation is not an issue for our relatively slow receiver applications. However, it seems to me that the additional hardware and use of the USB port does not make

the Game Voice faster. In fact, I think that the Game Commander 2 has a speed advantage. This was most noticeable on my slower Pentium 233 machine where it made a real difference of about a 0.5 second. Game Voice's delay makes trying to pause a fast scan on a specific frequency a bit difficult.

◆ Try the Future - Get One!

I'll leave the choice to you. But if you



Figure 2 - Game Voice's Main Screen Setup for RadioMax

want to try the future, voice command technology is here and the price is right.

Microsoft's SideWinder Game Voice retails for around \$50. Also, check your local discount clubs, such as SAM's Club, where I purchased it for \$39.95. See http://www.microsoft.com/ sidewinder for more.

Game Commander 2 is available for downloading at their website for \$29.95, obviously without microphone and headphone. For \$39.95 you can receive the software on CD ROM and the headphone and boom microphone. Check their website at http://www.gamecommander.com for details.

Keep in mind that neither of

these products is aimed at the receiver control market, but at the computer and internet gaming markets. Therefore, we have not covered many of their gaming features such as voice communications over the internet to fellow gamers.

I have yet to find a receiver control program that does function with these products. This includes RadioMax, ScanStar, Radio Manager and ScanCat. However, since these products simulate keystrokes, their usefulness

will depend on the control methodology of the receiver control program. Obviously, if the program uses cursor positions and mouse clicks, with no keyboard equivalents, these voice command programs will have limited use. Therefore, look for programs which are keyboard driven.

Apologies from my Fingers

In a recent column on the AOR standalone ACARS decoder, I compared its price to that of a used Pentium laptop. Since I had just purchased this type of laptop for a family member I knew its price was around \$350. Problem is, my mind said 350 but my fingers typed 250. Sorry for any inconvenience that this honest mistake caused. Where is voice input when I really need it?!

Next Time - I Promise

This new voice technology grabbed me by the throat and made me write about it. But as promised, next time we will go back to looking at what the future will bring to ACARS and aircraft data communications. I promise ...that is if I don't discover a major technology product breakthrough that we must share.

Talking to your radio and having it answer you back, is now a reality! But be careful. Your sanity will be brought into question by your family if they overhear your "conversations" with your radios.

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Yaesu VR5000 Wide Coverage Receiver

ollowing quickly the release of AOR's AR8600, Yaesu has begun shipments of their VR5000 widefrequency coverage (100 kHz-2600 MHz, less cellular) receiver. Intended for mobile or desktop operation, as is the AOR competitor, the VR5000 is also quite compact (7"W x 3"H x 8"D) and lightweight as well (4-1/2 lbs). Its front-lift legs tilt the viewing angle up to the user for desktop operation, revealing the bottom-mounted speaker which delivers its 1 watt of audio loud and clear.

This multi-mode receiver offers a selection of WAM, AM, NAM, WFM, NFM FMN, USB, LSB, and CW. Depending upon the mode selected, a variety of tuning steps may be chosen, from as fine as 20 Hz to as coarse as 500 kHz.

An optional digital signal processor (DSP) module is available as an extra-cost option from your dealer. It is a very useful accessory, providing tunable notch filter, bandpass filter, CW peaking filter, noise reduction, and CW pitch change. Other cost options include an 8 second digital audio recorder and a digital voice annun-

ciator for the current frequency setting.

A rear-panel connector accommodates one PL-259 coax antenna line for the entire frequency range; alternatively, an A/B switch selects a pair of spring terminals to attach either a balanced ("twin lead") or separate antenna and ground wires. If separate antennas are preferred for above and below 30 MHz, an external antenna switch or multicoupler will be necessary.

Also on the rear panel are RCA jacks for +8VDC @ 100 mA to power external accessories, a mute feature, and a 10.7 MHz IF output for an external spectrum display unit. A pair of 3.5 mm (1/8") audio jacks provide 4-16 ohms output for an external

speaker and 1000 ohm line output for a recorder or data demodulator.

A nine-pin sub-D connector invites computer control via the user's own RS232C cable; Yaesu does not produce software for this product.

A Multitude of Functions

Yes, the front panel is quite busy. Keys are small, and nearly all of the 35 buttons and knobs have two functions. A key-lockout command disables all front panel controls from accidental resets.

The backlit LCD is easy to read, with custom brightness and contrast user-selectable. Two volume controls are a clue that this rig allows dual reception; a second frequency may be selected within +/- 20 MHz of the primary receive frequency for instant



priority watch or simultaneous monitoring.

Both signals are activated by one squelch control; a separate tone control allows comfortable bass/treble adjustment.

The VR5000 memorizes the contents of up to 2000 channels in 100 banks, and allows up to 50 stop/start search ranges to be stored as well. One bank comes factory loaded with an erasable assortment of international broadcast frequencies. The scanning speed is approximately 16 steps per second, and channel identifications can be alphabetical or numeric.

A clock alarm sleep/timer also provides a world time clock function, displaying a global map with time zones.

Sensitivity

Tested alongside an ICOM R8500, we could detect little difference in weak signal reception between it and the VR5000. Published specifications show typical sensitivity in the HF range to be 0.3 microvolts for SSB, and 1 microvolt for AM; at VHF/UHF, 0.3-0.4 microvolts for SSB and NFM. These are quite respectable.

An "RF Tune" function allows a manual peaking of the desired signal, a sort of preselector. Its effectiveness in our test was marginal at best.

Selectivity

As with virtually every hand-held and mobile wide-frequency-coverage receiver on the market, the IF filters are modicum. They

> do a fair job, but there are many instances where you wish the skirts were steeper and deeper to reject adjacent-frequency interference. VR5000 is certainly no worse in this respect, and is actually a little better than some competitors, especially the handhelds. Understandably, the manufacturer does not provide selectivity specifications.

> An attenuator may be invoked for in-

stances of strong-signal overload, and a noise blanker effectively reduces pulse (spark) interference.

Dynamic Range

One common feature of all wide-frequency-coverage consumer receivers and scanners in the low- to mid-price class is their limited dynamic range, compromising their ability to handle strong signals without overloading. This produces unwanted products like intermodulation ("intermod") or desensitization.

The VR5000 is no exception. Connected to an efficient outdoor antenna, spurious signals will be heard on various parts



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of the spectrum where they shouldn't be. While invoking the attenuator dramatically reduces the interference, it also reduces desired signal strengths.

Spectrum Display

Small, wide-coverage receivers lend themselves particularly well to spectrum surveillance, and the VR5000 fits the task. Its built-in spectrum display unit presents a panorama up to 10 MHz wide, with simultaneous audio recovery in any mode appropriate for that step/range.

One apparent software glitch that is very irritating is that even though the user can enter his choice of sweep step, as soon as the tuning dial is turned to access a frequency, the step immediately reverts to its factory default.

As with all affordable LCD bandscopes, sweeps are sluggish, not "real time," so on/off keying is likely to be missed, especially on wider sweep spans. But for finding continuous signals, or searching small spans, it is excellent and intuitive to use.

At first thought, an option for real-time display would seem to be the use of an external CRT-type spectrum display unit (SDU) like the popular AVCOM SDM-42A plugged into the 5000's 10.7 MHz IF output jack. But the bandwidth of the VR5000 filters is quite narrow, limiting the display to a few hundred kilohertz, too narrow for reasonable spectrum analysis.

The dynamic range limitation is quite visible in the bandscope mode, filling the display with background noise when the receiver is connected to a good antenna. With the attenuator in place, the noise disappears, but so do spikes that would indicate the weaker signals.



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The graphics function of the built-in display can also provides an audio wave meter for displaying the sine wave representation of received modulation.

The Bottom Line

It's easy to be critical of any product, but the fact remains that the Yaesu VR5000 offers a great deal for the money. It is small, easy to operate, has wide frequency coverage, exhibits acceptable dynamic range and selectivity, excellent sensitivity, and clear audio. The display is easy to read, the radio has direct frequency entry as well as a tuning knob, and an abundant variety of supportive features. An AC adaptor, DC cord, and full manual are included.

The VR5000 retails for around \$900 from MT advertisers including Grove Enterprises. Bob Parnass will be reviewing its performance on VHF/UHF in an upcoming column.

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parnass@megsinet.com http://www.megsinet.com/parnass

AOR AR8600

he AOR AR8600 is a wide coverage, multimode receiver built in Japan. It replaces the AR3000 that we reviewed in November 2000 *MT*. The AR8600 is both a shortwave and VHF/UHF receiver, tuning AM, FM, and SSB signals in the .53 to 2040 MHz range. Three AM bandwidths, three FM bandwidths, CW, USB, and LSB are supported.

The AR8600 is powered by 12 - 14 VDC or from the AC mains using the provided wall wart power supply. A telescoping antenna and a tiny, removable AM broadcast antenna are included, but no mobile mounting bracket is supplied or mentioned in the user manual.

Extra cost options include a dealer-installed eight AA 700 mAH NiCd battery pack and five "slot" cards which can be plugged into edge connectors on the rear panel; TE8200 tone eliminator; CT8200 CTCSS squelch; VI8200 inversion descrambler; RU8200 20-second audio recorder, and EM8200 secondary memory. We tested AR8600 serial number 551028, but have none of the options to evaluate.

VFOs, Memory, Scanning, and Searching

The AR8600 has two VFOs and displays the frequency of both simultaneously. The tuning step size is more flexible than found in most receivers. It is adjustable, regardless of emission mode, in 50 Hz increments up to 999.95 kHz, with an additional choice of an exact 8-1/3 kHz. The Yaesu VR-5000 restricts steps sizes depending on mode which prevents tuning FM signals using a 1 kHz step, even though a 1 kHz step is available in SSB modes. You can offset the AR8600 tuning if you want to tune only the interstitial channels, e.g., use a 25 kHz step size to tune 470.0125, 470.0375, 470.0625, etc.

The VFOs are handy for general band tuning or searching, using both VFOs to designate upper and lower limits. Our AR8600 often stops a few kHz away from a signal's center frequency. Up to 50 frequencies may be skipped. The AR8600 will not stop on signals within 10 kHz of designated skip frequency.

In addition to searching between the VFO limits, there are 40 pairs of search limits available. They can be linked together, though the step, mode, and attenuator settings can differ for each one. Each search bank also supports up to 50 "pass" (skip) frequencies.

An Auto Store facility stores active frequencies into a memory bank. The AR8600 stops on the active frequency during an Auto Store and you can hear the audio. It will not resume searching until end of transmission, de-

pending on the search settings.

The 1000 memory channels are divided into 20 banks, designated A, a, B, b, etc. Initially, each bank has 50 channels, but you can reapportion 100 channels between bank pairs. For instance, bank A can contain 15 channels and bank a can hold the remaining 85 channels.

An alphanumeric label can be programmed



for each memory channel, memory bank, and search bank. Banks can be scanned individually or in combination.

Physical

The AR8600 is ruggedly built in a clamshell metal cabinet with cast metal front and rear panels. It "feels" like an expensive radio and won't walk off the desk when keys are pressed. The tuning, volume, and squelch knobs are rubbery and easy to grasp. The green LCD display and keypad are brightly lit, and you can adjust the LCD contrast to suit.

A standard DB9 connector is fitted on the rear panel so a computer may control the AR8600. AOR thoughtfully documents the computer commands in the user manual.

A 10.7 MHz IF output jack is provided but is disabled, as verified by connecting HP spectrum analyzer. The user manual advises that enabling the IF output is an operation which "should be carried out in a workshop," but doesn't tell how. An odd, 8-pin jack on the rear provides unfiltered detector output, high

and low level audio outputs, and tape recorder switching. This is a \$900 radio, but AOR doesn't include the mating connector.

Performance

Our AR8600 performs fairly well on VHF/ UHF, though we confined testing to frequencies below 1300 MHz. The image rejection, audio, intermod immunity, squelch tail length, and sensitivity are on par with good scanners. We found several birdies (see table), some wide enough to interfere with reception on adjacent frequencies. At 13 channels/sec, our AR8600 cannot be declared a fast scanner.

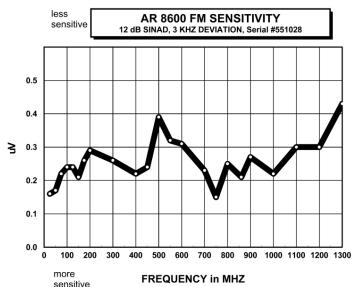
Bob Grove wrote about the AR8600's shortwave performance in February 2001 *MT*.

For this review, we compare shortwave reception of our AR8600 side by side with a Yaesu VR5000 (s/n 0L040004), Japan Radio NRD545 (s/n RG05179), and ICOM IC-R8500 (s/n 01075). They share the same 132-foot center-fed Zepp antenna through a Mini-Circuits ZFSC-4-1 passive splitter (6+ dB loss, see June 1999 *MT*).

Our AR8600 and VR5000 are overloaded below 30 MHz without attenuation and are severely stricken with AM broadcast intermod. Our AR8600's attenuator reduces, but does not eliminate the problem. The more expensive NRD545 and IC-R8500 are nearly intermod free and a pleasure to use under the same conditions.

Wrapup

The AR8600 is solidly built. The wide spectrum coverage, front panel illumination, flexible



step sizes, and adjustable memory banks are assets we'd like to see in more receivers. It oozes with features and options, but the multiple keypad sequences make the AR8600 maddening to use and program. Changing the mode and step size requires at least four key presses, for instance. The 143-page AR8600 manual is much more comprehensive than the Yaesu VR5000 manual, despite a few omissions.

Our AR8600 is a poor performer below 30 MHz, where it overloads too easily when using an outdoor antenna. VHF and UHF performance is on par with other scanners.

AOR AR-8600 Birdies (partial list)

33.27, 44.6, 49.15, 115.2, 117.96, 121.185, 122.88, 127.795, 143.655, 152.375, 157.285, 162.2, 167.115, 172.03, 222.97, 222.995, 240.85, 250.675, 260.5125, 267.5875, 267.6125, 275.25, 285.0875, 294.9125, 314.575, 324.4125, 329.325, 339.15, 348.9875, 353.9, 356.8125, 358.8125, 368.65, 378.475, 388.3125, 398.1376, 403.05, 412.8875, 413.125, 445.95, 490.95, 506.275, 820.85, 904.4125, 924.075, 926.4125, 933.9, 936.0, 943.7375, 950.4, 963.4, 964.8, 965.2, 971.475, 981.1375, 992.8875, 993.6

Measurements

AOR AR-8600 Receiver S/N 551028

Retail: about \$900 AOR U.S.A., INC. 20655 S. Western Ave., Suite 112 Torrance, CA 90501

Phone: 310-787-8615 Fax: 310-787-8619

http://www.aorusa.com

Frequency coverage (MHz):

0.1 - 2040

Steps: 0.05 kHz - 999.95 kHz in 0.05 kHz increments

NFM modulation acceptance: 9 kHz

Attenuator:

12 dB @ 14 MHz 15 dB @ 40 MHz 14 dB @ 155 MHz 13 dB @ 460 MHz

9 dB @ 860 MHz

Intermediate Frequencies (MHz):

1) 243.85 or 754.85 2) 10.7 or 45.05 3) 0.455

Image rejection due to 1st IF:

59 dB @ 40 MHz 66 dB at 155 MHz 43 dB at 460 MHz

Audio output power, measured at speaker jack:

550 mW @ 10% distortion

Squelch tail near threshhold (1 uV @ 155 MHz): 30 ms.

Practical memory scan speed: 13 channels/sec. **Search speed:** 33 steps/sec.

Collectors' Corner

If you have crystals to sell or are looking to purchase used crystals, check out the Crystal Exchange web site at http://senac.com/boards/880

The Fanon/Courier brand was popular back in the days of crystal controlled scanners. Fanon offered several portable, mobile, and desktop models.

The Fanon Scanfare M8-HLU (fig. 2) is an 8 channel mobile model covering 30 - 50, 146 - 174, and 450 - 475 MHz. It is small for a 3-band scanner, measuring only 5 inches wide. The double conversion circuitry employs 10.7 and 0.455 MHz IFs.



There are no cumbersome jumper wires for band programming like the Electra/Bearcat BC-12. Instead, you plug each crystal into a different position on a multi pin crystal socket depending on the band of operation.

The M8-HLU is powered by 12 VDC and requires an optional AC wall wart for base station use. Our M8-HLU was manufactured in 1986 and they sold for about \$100 until 1990.

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Audio Accessories

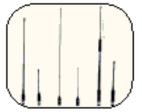
Our innovative audio products have made us famous. From the comfort of our SPM-400 mini-boom microphone to the low-profile of our EH-1 "invisible" ear phone and SPM-700 surveillance mic, we have the right accessory for the job!





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ASY ACCESS RADIO

Cobra's Snazzy microTALK Professional 2000WX

t seems like everywhere I look, people are adopting Family Radio Service (FRS) handitalkies. It also seems like the number and variety of places where you can buy FRS gear keeps expanding – office supply stores, discount houses, electronics stores, mail order catalogs, the Internet, and so on.

And it's little wonder: FRS radios just plain work great for very short range communications. Sure the manufacturers all claim "up to two miles," but the reliable distance that you can count on under virtually all conditions is something like a quarter to a half mile. (To be fair, there have been documented cases of FRS communications over much greater ranges, but when we're talking about reliable communications, it is better to underestimate.)

Still, these diminutive FRS handitalkies offer crystal clear communications with easy operation and no need for a license. People are using them in all kinds of outdoor activities, at public venues to keep members of a group in contact, for communications between cars caravaning on a trip, and even as inter- and intra-building intercoms. Once you start using FRS, there's almost no end to the applications that keep popping up.

I've heard only two consistent complaints about FRS radios. First, they are expensive. And, for a long time, they were. But prices have dropped, and now you can buy decent FRS units for a third what they cost not long ago.

Second, in many applications, a bit more range would be welcomed. Cobra Electronics was listening and has an answer. At the Consumer Electronics Show in January, Cobra announced the addition of two new professional models to its microTALK line of FRS products. According to Cobra, "The microTALK Professional series offers five-mile range of the Professional 1000 and Professional 2000WX and Emergency Weather Alert and 10-Channel NOAA weather capabilities on the Professional 2000WX."

MicroTALK Professional

The 2000WX is a handsome unit,

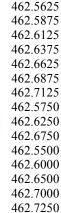
measuring about 5 inches high (excluding antenna) by 2.25 inches wide, by 1.375 inches deep (excluding belt clip). The case, lightly sculptured for easier gripping, is a metallic copper mist colored plastic.

On the top of the case, there is a sturdy flexible rubber antenna (which is removable) and a knob that controls power and receive volume. On the left side, there is a soft rubber button for push-to-talk and a Monitor button for defeating the auto-squelch.

On the right side are removable rubber covers that give access to jacks for an optional power cord and various optional speaker-microphones. On the back, there is a large plastic belt clip and a hatch for installing the six AA alkaline batteries that power the 2000WX.

On the face of the 2000WX, you'll find a backlit liquid crystal display that shows "what's up" with the 2000WX, Up/Down and Call buttons, a Function button, an Enter button, a Hi/Lo/Lock button, and speaker/microphone grill.

The 2000WX puts out 2.3 watts (high power) or .5 watts (low power)





The first seven channels are shared with the Family Radio Service, but the last eight channels are General Mobile Radio Service only. As a result, on the very first page of the manual, Cobra clearly states, "The PR 2000WX Professional radio operates on General Mobile Radio Services (GMRS) frequencies which require a Federal Communications Commission (FCC) license." The manual then goes on to give the phone numbers that are needed for obtaining the appropriate licensing forms or for contacting the FCC.

Cobra has done the right thing in pointing out that a license is needed. Nevertheless, because the first seven channels are shared by FRS, which needs no license, and GMRS, which requires a license, it wouldn't shock me to find people using these radios on the first seven channels, at least, without bothering about a license.

In addition to 15 channels, the 2000WX offers a bunch of goodies in an attractive package: 10 weather channels, weather alert, 38 continuous tone-coded squelch system (CTCSS) tones, roger beep, dual watch, 10 memory channels, memory scan, dual power, and a battery saver circuit. The 2000WX does not, however, offer GMRS repeater capability.

Even better, the performance sparkles. On high power, it offers easily double the range of the best FRS unit I have ever tested. Audio is crisp and clear, and the unit is easy to operate. In addition, the main weather channel in my area sounded absolutely terrific on the 2000WX. About the only quibble I have is that, if you have the volume cranked waaaaayyy up to hear someone who is very soft-spoken, the roger beep tones come through as absolutely thunderous! On balance, this is a teensy gripe compared to the otherwise stellar performance of this radio.

In short, if you want a handitalkie for communications over better-than-FRS ranges and the ability to receive weather information and alerts as well, I can wholeheartedly recommend the Cobra Professional 2000WX. But, don't forget about that license!

Suggested retail price of the 2000WX is \$179.99. For more information about Cobra Electronics and its products, visit *http://www.cobraelectronics.com* or call 1-773-889-3087.





Winradio AX-31B **Planar Antenna**

by Bob Grove

WiNRADiO, an Australian company famous for innovative computer-hosted receiving products, has just released their AX-31B active VHF/UHF antenna. Although designed primarily for their own receiver line, the antenna works just as well on any VHF/UHF scanner or other receiver. It is not capable of transmitting.

The planar (flat plate design) enables the 8.5" x 11.5" board to be hung on a wall, or even on a window. A six-foot length of RG-58/U cable terminated with a BNC connector leads the signals to a nearby radio.

Architecturally, the layout incorporates a log-periodic dipole array (LPDA) antenna design etched on both sides of a fiberglass circuit board; an integral, solid-state preamp is part of the same board. The antenna is impedancematched to the input of the amplifier by an RF

Powered by the 9-volt battery, the amplifier's 25 mA current drain assures continuous operation of many hours before replacement is necessary; a super-bright LED will remind you that it's still turned on! A simple modification, the addition of a resistor, enables the antenna to be powered remotely from an AC adaptor through the coaxial cable.

Claiming a 230-1400 MHz frequency range, we discovered that the unit actually works quite well over a much wider swath of spectrum. Gain is advertised as 20 dB, dropping off as the unit is utilized outside its advertised bandwidth. Technically inclined readers will be relieved to know that the third order intercept point is a healthy 25 dBm, protecting it from generating intermod under most signal receiving conditions.

While the specs show an antenna forward gain of 6 dBi, the small dimensions of the LPDA elements limit its directional response to the higher end of its bandwidth. At lower frequencies it is essentially omnidirectional.

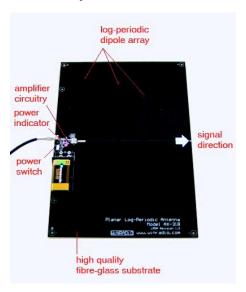
Since the AX-31B is not intended for outdoor use, it's only fair to compare it with other indoor antennas. We selected a Uniden BC3000XLT hand-held scanner, its factory rubber duckie antenna, and a Condor whip for our test. A synopsis of observations at my indoor location, along with an indication of the best antenna at each sample frequency(*), can be found in Table 1.

The Bottom Line:

We are eternally in search of the perfect antenna: small, wideband, potent, and immune to interference. It doesn't exist. Signal capture is a function of element size and placement, and active (amplified) antennas require power, generate noise, and are subject to overload problems like intermodulation and desensitization.

But the AX-31B has its niche. Exhibiting decent gain, acceptable noise figure, and high overload immunity, it works well in the upper VHF/UHF land mobile frequencies, and its low profile invites unobtrusive placement next to a wall or window.

It can even be used in a pinch for upper shortwave frequencies - as low as 15-20 MHz



or so - but doesn't work much better than a few feet of wire randomly run around the room, and it is just as vulnerable to interior electrical interference from appliances, electronic accessories, and power lines.

Nonetheless, for the new genre of wideband scanners which tune down into the shortwave frequencies, the AX-31B offers significant improvement over the factory-supplied whip, and since those scanners commonly have just one antenna port, the AX-31B can be that one antenna.

While a good rubber duckie like the Condor may work just as well on some frequencies, it is not always convenient to set the radio where the whip works best. By experimentation, the AX-31B can be located at an optimum spot for reception and the cable run to the monitoring position.

There is no substitute for an efficient outdoor antenna. But there are cases where such an installation is impractical or even impossible. Given its few limitations, the AX-31B is a welcome addition to the cadre of listening tools.

The AX-31B planar antenna is available for \$129.95 plus shipping from most WiNRADiO dealers, including Grove Enterprises for \$109.95 (PO Box 98, Brasstown, NC 28902; 1-800-438-8155 or visit http://www.grove-ent.com)

Table 1: A Comparison of Indoor Antennas

10.010 10.11 00.11.		
FREQ. MHZ	ORIGINAL WHIP	CONDORAX-31B
27.185 (CB)	Undetectable	Some signals *Much stronger
49.845 (Baby monitor)	Undetectable	Good, some hiss
88.1 (FM broadcast)	Trace	*Full quieting Good, some hiss
88.5 (FM broadcast)	Undetectable	*Full quieting Undetectable
		*Receivable
109.8 (Airport VOR)	(Equal)	
151.550 (VHF hi)	*Good, some hiss	*Good, some hiss Weaker
162.400 (NOAA weather)	Readable, hiss	*Full quieting
		*Full quieting
171.025 (IFLOWS)	Very weak	*Full quieting
107 005 (III) I 1		*Full quieting
407.225 (Mil trunking)	Very weak	Undetectable *Moderately strong
411.550 (Hydrotelemetry)	Strong, some hiss	Strong, some hiss *Full quieting
453.075 (UHF mobile)	Weak	Weak
1301073 (0111 11103110)	····	*Full quieting
462.750 (UHF mobile)	(Equal)	, ,
475.050 (UHF carrier)	Undetectable	Undetectable
		*Receivable
499.750 (UHF TV)	Noisy	Noisy
055 7075 /11115 +	/r \	*Full quieting
855.7375 (UHF trunking)	(Equal)	
864.7375 (UHF trunking) 996.000 (VOR)	(Equal) (Equal)	
1090.000 (Aircraft DME)	Weak, receivable	*Receivable
1070.000 (Allciuli DML)	TTOUR, TOCOTYUDIO	Undetectable

NOTE: Results will vary with signal direction and propagation, placement and polarization of the antenna, and location of the installation. Directivity is present at the higher frequencies only, becoming omnidirectional (nondirectional) lower, and will be influenced by nearby metal masses.

What's NEW Tell them you saw it in Monitoring Times

Alinco DJ-X2000T

The new Alinco DJ-X2000T, expected to be available in mid-March, is a triple-conversion, wide-coverage handheld scanning radio with a frequency range of 1 kHz to 2150 MHz (cellular frequencies blocked on U.S. "T" version). Receiving modes are NFM/WFM (mono, stereo)/AM/CW/ USB/LSB. The user has a choice of 25 different channel steps, including automatic and user-programmable. Two thousand

memory channels are divided into 50 banks, 40 channels in each.

The U.S. version comes with 4.8V 700mA Ni-Cd pack, multi-voltage switching quick charger, belt-clip, hand-strap, antenna, and ins truction of manual. Cigarette-plug DC cable, long-life Ni-Cd pack, ear-

phone, soft-case for battery packs, and mobile bracket are available ontions

List price on the Alinco is \$835 but street price on the DJ-X2000T from dealers such as Grove Enterprises (800-438-8155; http://www.grove-ent.com) is \$699 plus shipping. Watch for Bob Parnass' review of this full-featured handheld in an upcoming issue of MT.

Yaesu VR-120

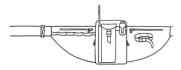
Yaesu has just released its new VR-120 pocket radio. Looking much like the popular ICOM R2, and covering100 kHz-1300 MHz (less cellular)



in the AM and FM modes, the triple-conversion pocket scanner has 640 memory channels in 10 banks, 0.3 microvolt VHF/UHF sensitivity, and measures only 2.3"W x 3.3"H x 1"D. Street price should be in the \$230 range. Contact Grove Enterprises or your favorite dealer for price and availability.

Yaesu FT-817 Pouch

In response to numerous requests, Cutting Edge Enterprises is designing a carrying pouch for the new Yaesu FT-817 handheld transceiver. The package consists of a lightweight padded pouch with a strong belt clip, exterior pockets to hold extra antennae and an extra battery. A clip-on mike bracket can be attached wherever you need it.



For extra carrying capacity, a custom fanny pack will be available with zippered compartments, webbing loops and tie-downs. The pouch clips securely to the center of the fanny pack. An optional 2.3 amp 12V rechargeable battery with wiring harness for the FT-817 and a two-stage automatic charger can also fit into the assembly. Cutting Edge is calling this design the WorldPouch.

For pricing and availability on this product under development, contact Cutting Edge Enterprises, 1803 Mission Street, Suite PCM-546, Santa Cruz, CA 95060; 831-429-5384; http://

www.powerportstore.com.

New Products from Garmin

We haven't covered GPS equipment often since it stopped being a novelty, but the industry certainly has not stood still. Here are some of the latest refinements from Garmin.

In *StreetPilot III*, Garmin has upgraded its popular navigation

GPS receiver to include turn-byturn voice prompts. The dashmounted unit is powered by your vehicle's battery or six AA batteries. Its built-in base-map includes all interstates, major highways, rivers and lakes for the North America, plus major streets in metropolitan areas. Detailed

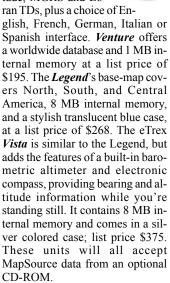
maps for specific cities and turnby-turn guidance may be down-



loaded as needed from the MapSource City Navigator CD-ROM. Purchase includes the unit, mounting bracket, PC interface cable, 12V adapter cable with external speaker, 32MB data card, USB data card programmer, and the MapSource City Navigator CD-ROM. List price is \$1,273 though street price may be somewhat less.

For users who can't be tied to a vehicle, Garmin's eTrex series are among the smallest GPS handheld receivers on the market. New models in this line are the eTrex Ven-

ture, Legend, and Vista, all of which come with crisp, high resolution liquid crystal display, full-feature navigation capabilities, position information in latitude/longitude, MGRS and Lo-



Garmin also carries a series of products especially designed for fishermen, including sounders, fish-finders, and MapSource databases of fishing hot spots and waterways. The maps provide detailed

information by region of lake beds, ramps, hazards, mile markers and much more, as well as marked fishing areas, bes



fishing areas, best times of year, types of fish, etc.

For more information on these products, see your local marine and recreational dealer or contact the company for a dealer near you: Garmin International, 1200 East 151st Street, Olathe, Kansas 66062 (ph. 913-397-8200; web http://www.garmin.com).

Computer Control the Uniden BC245xIt/ BC895xIt

WinScan Version 2.1 is a software control program which works under Windows 95/98/NT 4.0 to control either the Uniden BC245xlt or BC895xlt scanner. On your screen the Virtual Scanner Interface(tm) looks and works just like the front of the scanner you are using.



There are the usual advantages of a computer control program – constructing custom scan lists, importing database info from other sources, programming the scanner, uploading scanner memory to the computer, adding alpha tagging to frequencies, etc. The enhanced search engine allows you to see what you are searching, how long you have been searching for and how many times a frequency has been hit.

WinScan enhances the trunktracking capabilities of these scanners by enabling the 895 to scan in



conventional and trunking mode simultaneously; allows you to program EDACS and Motorola talkgroups and frequencies for your 245; and allows you to program Motorola

trunked systems without being in range of the system.

The program provides a new Bandscope for the BC895xlt, has a Speed Enhancer scan mode

for the 245 Multi-Scan feature; and allows you to digitally record your favorite frequency with the click of a button!

System requirements include a Pentium 100 MHz computer; Windows 95/98/NT 4.0; 16 MB RAM; 2 MB Video Card; 10 MB free hard disk space minimum; free COM port; 3rd party interface cable if used with the Uniden BC895xlt; supplied interface cable with Uniden BC245xlt.



WinScan is \$59.95 from Grove Enterprises and other dealers. For technical questions, call Grove at 828-837-7081 or e-mail the software developer at products@pozillasoft.com

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to mteditor@grove-ent.com.

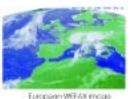


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A Family Affair: The R.L. Drake Story

A Family Affair

By John Loughmiller, KB9AT

In recent years, retrospective books have appeared on radio giants such as Collins, Heathkit, Hallicrafters and the Zenith Company. It was only a matter of time before someone took

up the noble task of documenting another radio great – the R.L. Drake Company. John Loughmiller, KB9AT, has assembled over 250 pages of material on the Ohio-based company and its products in his new book, A Family Affair: The R.L. Drake Story.

Right off the bat, Loughmiller sets the stage for what made the Drake Company different. Following conventional wisdom of the 1950s, bigger – and heavier – was better. For example, at 70 lbs., the

Hallicrafters Company boldly proclaimed its SX-101 receiver to have the "heaviest chassis in the industry." At this same time Bob Drake, the company's founder, was developing a far different radio: the 1-A Receiver. It was only 7 inches wide and weighed less than 20 pounds. That was

small for its day, and it set a trend that would become a hallmark of the Drake amateur line – compactness.

The book not only records dates, places and names, but gives personal insight into the Drake

company, much as you would expect to hear if you were sitting in the employee break room. You learn that Bob Drake was the company, and about the slump in morale that set in after his death. You learn about the conflicts and camaraderie between employees. In one hilarious anecdote, the author tells of an unsuspecting technician turning away from a receiver under test, while a co-worker placed a lit cigarette under the chassis of the radio. With smoke rising through the top of the case, he alerted his colleague to the situa-

tion. The technician frantically threw every switch in sight in an attempt to save the radio. When he discovered the cigarette, a mad chase began across the service floor.

Not all of the book is about history. Most of the second half is devoted to technical tips,

simple modifications and a grading standard for Drake equipment that is derived from the well-respected Collins standard. This section should be especially useful to anyone interested in collecting or restoring Drake gear. The back of the book shows catalog reprints and photos of several modern-day Drake stations.

Although the book is loaded with black & white photos, many are not as clear as they could be. In the copy I examined, the images on pages 19, 23, 107, 115 and 129 were especially poor. This is a shame, because many of these were close-up photos of Drake equipment, presumably in good to excellent condition. The pictures don't do the equipment or the book justice. In contrast to the photos, the text of the book is unusually clear and easy to read.

A Family Affair: The R.L. Drake Story is published by the Technical Support Group, 15 Saddle Ridge Trail, Alexandria, KY 41001-9105; tel. 859-635-6487; www.home.fuse.net/tsg/. \$29.95 plus shipping and handling. It may also be ordered from Universal Radio, 6830 Americana Parkway, Reynoldsburg, Ohio 43068; tel. 800-431-3939; www.universal-radio.com.

- Review by Kevin Carey, WB2QMY

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The Silly Season – It's All Year Long!

Now that the protracted Presidential election is finally over, the charges and countercharges have settled into history. People seem to have vivid imaginations, often confusing fact with imagination. Such creativity is rife in the political arena, but we see it daily all around us.

Occasionally something comes across my desk that makes me wonder if intelligent life still exists on Planet Earth. One of these epistles concerns a recent outbreak of contrail-itis. Contrails, as our air buffs know, are condensation clouds left behind high altitude aircraft, resulting from combustion products (mostly water vapor) hitting the frigid air at those elevations. The resulting ice crystals, admittedly contaminated with less benign chemical compounds, leave a spectacular white trail behind the aircraft's jet engines.

Painted at those altitudes, the wispy white trails are real attention grabbers – apparently especially so if you're paranoid! Yes, it seems that there are those who are sure that our government is spraying its citizens with (take your pick):

- a. Mind altering drugs
- b. Slow-acting poisons
- c. Crop-killing herbicides
- d. Sterility agents
- e. Carcinogens
- f. Hazardous wastes

Perhaps these "mysterious" malignant operations are being conducted either by members of the Trilateral Commission or the New World Order, two perennial favorites of the terminally twitchy. In spite of the decades that these concepts have been openly available to public scrutiny, there are those who are adamant in their belief that these represent an urgent threat to our national sovereignty. Often, these same impressionable folk will weave in suspicions about the U.N. or NATO just for good measure.

You can see a good profile of the Commission on their Web site at http://www.trilateral.org, and a delightful, skeptical treatment of the Order (and other conspiracy notions) at http://www.skeptic.com/04.3.callahan-end.html.

I can recall, as a child, looking upward, marveling at the vapor trails left from aircraft. During my scientifically-impressionable teens, I followed high altitude experiments being conducted with dry ice, sodium iodide crystals, cesium vapor, aluminum foil ("chaff"), and any of a number of other comparatively benign substances during a period of considerably less suspicion.

These experiments were conducted to modify weather systems and radio signals, not human behavior. I don't recall anyone dying, or even getting sick. So why the recent spate of hysteria over a common experimental program?

Is overexposure to violent video and computer games, movies, and TV taking its toll on the public's rationale? Is growing disgust at politics for profit driving Americans to cynicism and suspicion? Or is it merely the fantasy of fundamentalists who will cite nearly anything as evidence of "prophetic fulfillment?"

Just a few years ago, well-meaning folks alerted me to trainloads of Russian-marked armored vehicles being conveyed to some unknown destinations, ostensibly to stage a takeover of America.

Think about it. If you wanted to take over America, would you send your equipment, marked clearly with your country of origin, during daylight, through heartland America? I don't think so. Photos, please? Urban legend? Could be.

Then we have black-suited paratroopers dropping into a Texas town (have you seen "Red Dawn" lately?), and barbed-wire internment camps being set up in remote locations to impound U.S. citizens, and on and on.

Oddly enough, when availability of real news has never been more pervasive, many Americans would rather believe the much-altered predictions of Nostradamus as reported by historical revisionists, or the seriously-flawed prognostications of the late Jeanne Dixon who couldn't even foretell her own death.

Just two years ago – May 1999 – a report was widely circulated that the citizens of Reston, Virginia, were sprayed with a brown, hepatitis-inducing agent by Soviet helicopters, and that thousands of residents would be expected to contract the disease. Oddly, there were no police reports of such an event, no scanner intercepts of related communications, no media coverage of such an extraordinary invasion.

I recently drove through Reston, and it was my impression that it looked pretty normal. How about it, Reston; are you still there?

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- 100 kHz 60 MHz†
- Commercial Grade
- Synchronous AM Detection (S-AM)
- · Optional DSP with Auto Notch Filter
- All Mode
- Triple Conversion
- Twin Passband Tuning (PBT)
- Large Front Mounted Speaker
- Large Display
- Well Spaced Keys and Dials
- 1000 Memory Channels
- Up to Two Optional Filters
- PC Remote Control with ICOM Software for Windows[®].



"A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts." — QST, 1/00

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ICOM technology brings you super wide band, all mode coverage from HF to 2GHz, including shortwave and VHF/UHF, while maintaining a constant receive sensitivity. The IC-8500 is not simply a scanner - it's a professional quality communications receiver with versatile features from high speed scanning to computer control.

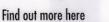


"If you want a receiver that is both a superior world band radio and a solid scanner, the ICOM IC-R8500 is the best choice." — Passport to World Band Radio, 1998

IC-R8500

The experts choice

- 100 kHz 2.0 GHz[†]
- Commercial Grade
- Commorcia
- All ModeIF Shift
- Noise Blanker
- Moise pinitkei
- Audio Peak Filter (APF)
- Selectable AGC Time Constant
- Digital Direct Synthesis (DDS)
- 1000 Memory Channels
- RS-232C Port for PC Control*



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